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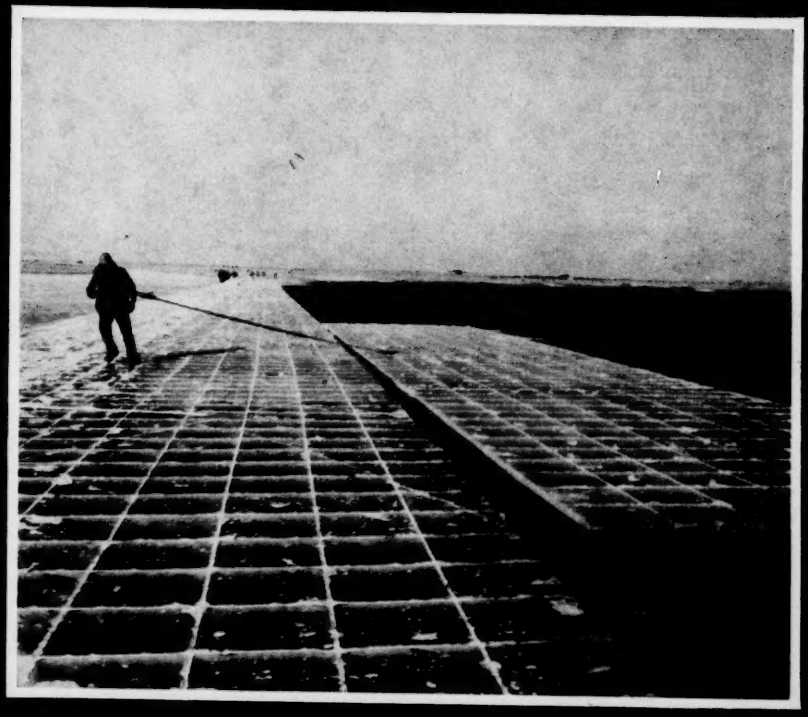

Increase the Storage Time of Vegetables ..... Page 11

APRIL • 1951

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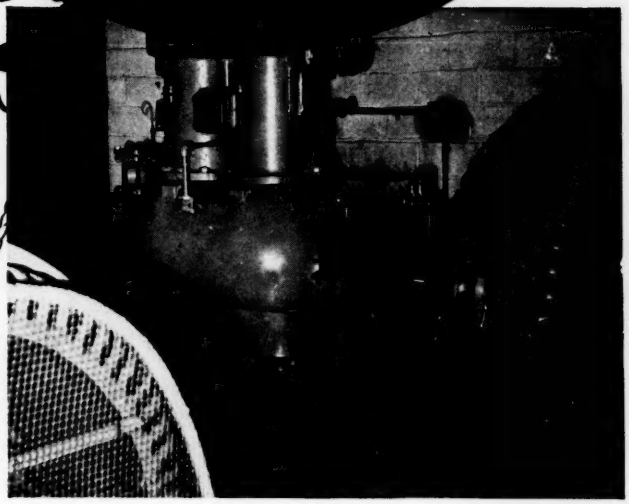

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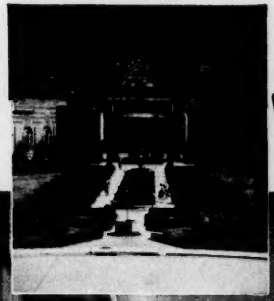

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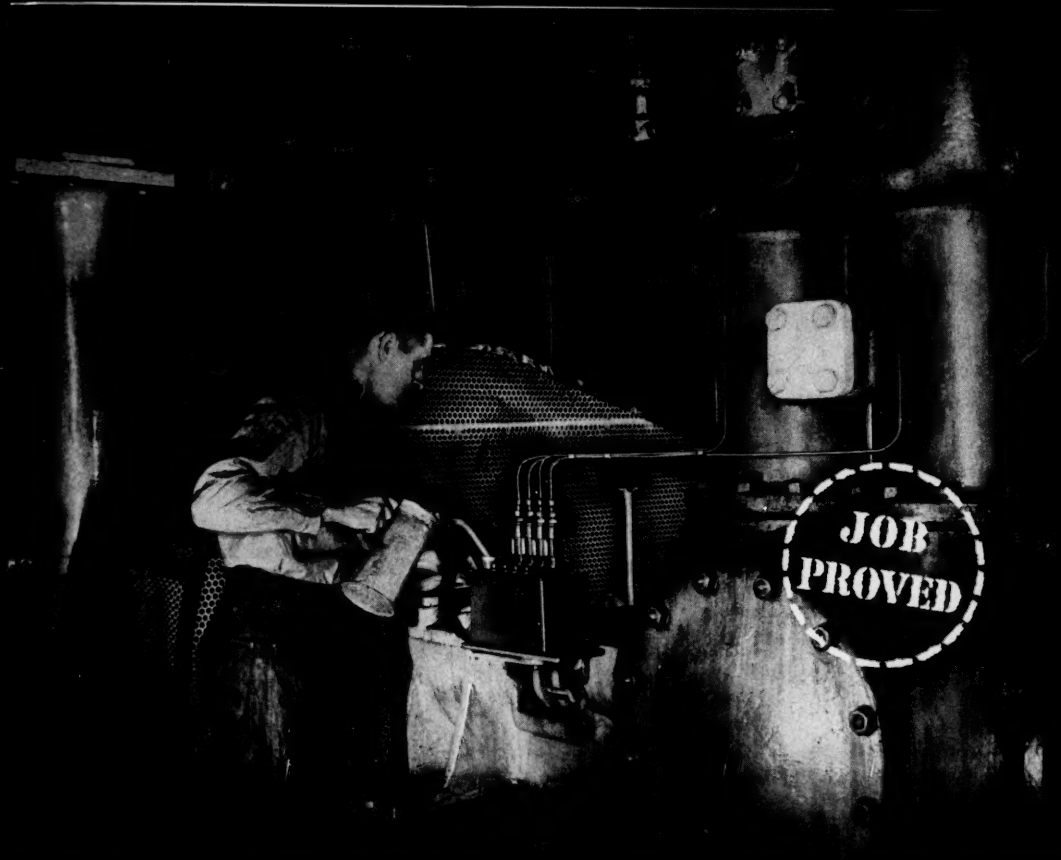

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April, 1951

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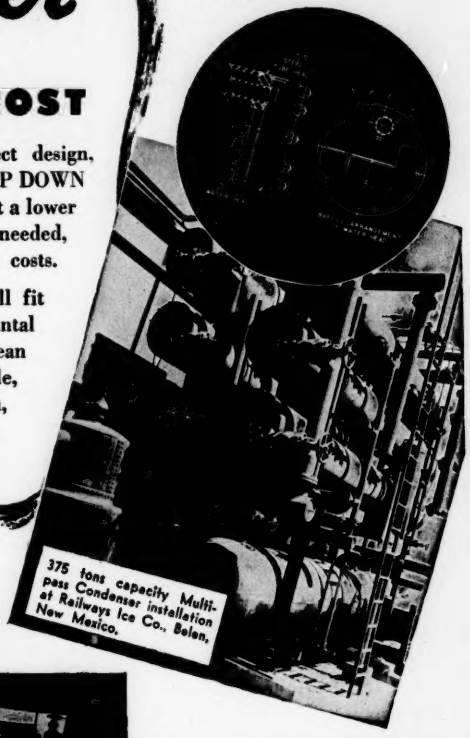

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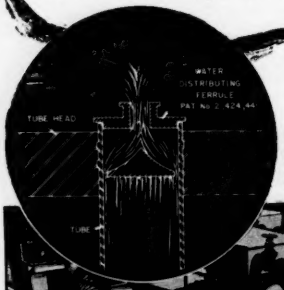

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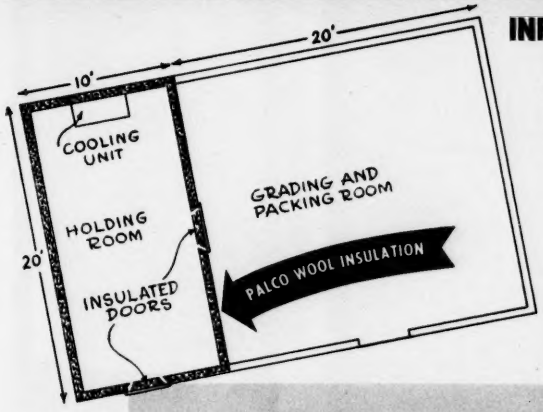

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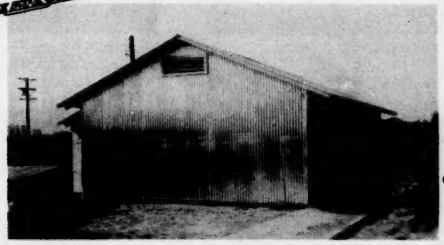

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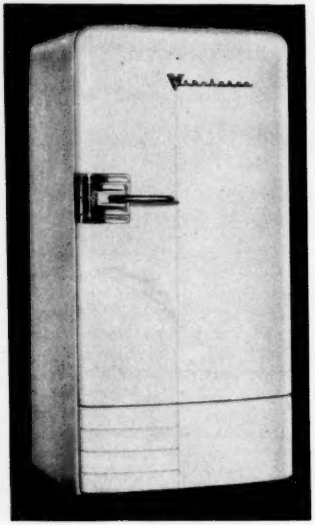

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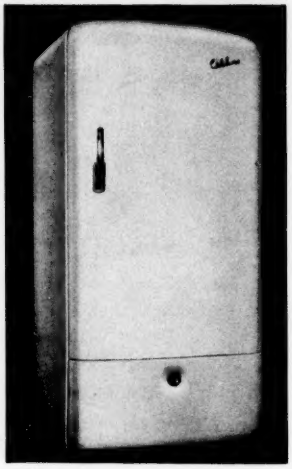

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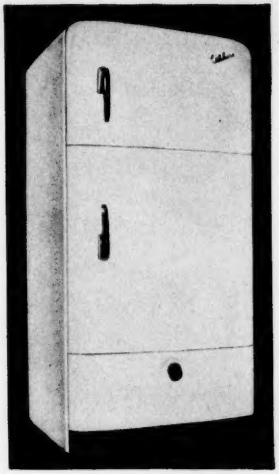

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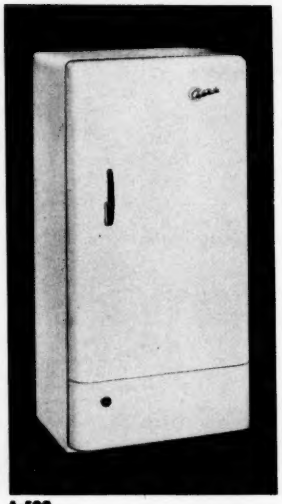

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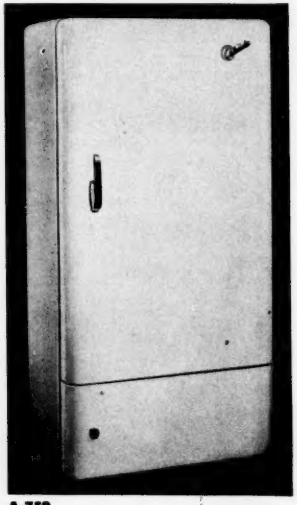

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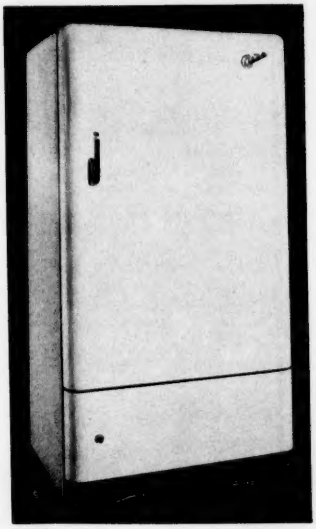

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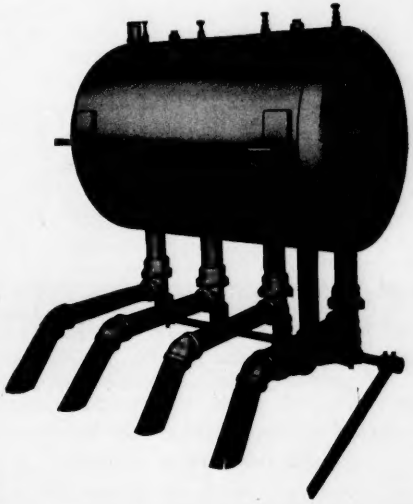

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In The Spotlight

STORAGE OF GRAPES in California has developed into big business and this has created a good market for ice for use in grower-operated refrigerated storage houses located near ranches or shipping points. This subject is covered in the article starting on page 11.

GOVERNMENT CONTROLS are again beginning to be felt by business, as an adjunct of the military preparedness program. An important order relating to priority rating for maintenance, repair and operating supplies is reviewed on page 14.

AN EXPANSION and modernization program has been completed by the Crystal Ice & Cold Storage Co., Sacramento, Calif., increasing refrigerated space to a capacity of 235 cars and installing all mechanical handling equipment, as described and illustrated in article on page 15.

A MILLION DOLLAR ice plant is being built at Laramie, Wyoming for icing refrigerator cars by the Pacific Fruit Express Company, which will replace one of the largest natural ice operations in the country. For description and pictures of the new project see page 17.

BLACK SPOT on shrimp is an undesirable condition which may develop in refrigerated storage. After three years research work at Louisiana State University, backed by the Refrigeration Research Foundation, some information has been developed on the cause and prevention of this condition. A report on this work presented at the annual meeting of the Refrigeration Research Foundation and the National Association of Refrigerated Warehouses starts on page 49.

AN IMPORTANT part of any industrial operation is a well planned safety program. Effective prevention of industrial accidents is based upon investigating the causes of accidents and then removing them or applying remedies. This subject is covered by a safety engineer in an industrial plant in the article on page 21.

FIRE PREVENTION in refrigerating plants are important because of the staggering losses that may be inflicted by one big fire. This subject is analyzed and preventive measures are suggested by a safety engineer in a refrigerated warehousing plant in the article starting on page 19.

FOR THE SAFETY engineer, plant accidents involving bursting and breaking of vessels, pipelines and machines offer a challenge—a challenge to seek and determine the cause and apply a remedy, or preventive measures. This subject is discussed by a plant engineer in the article on page 25.

MEAT DEALERS in the St. Louis area heard and saw an interesting series of demonstrations on cutting and displaying poultry. The use of ice for poultry was emphasized by the demonstrator who said dressed chickens keep better, look better and sell faster when displayed on crushed ice. See page 37 for details and pictures.

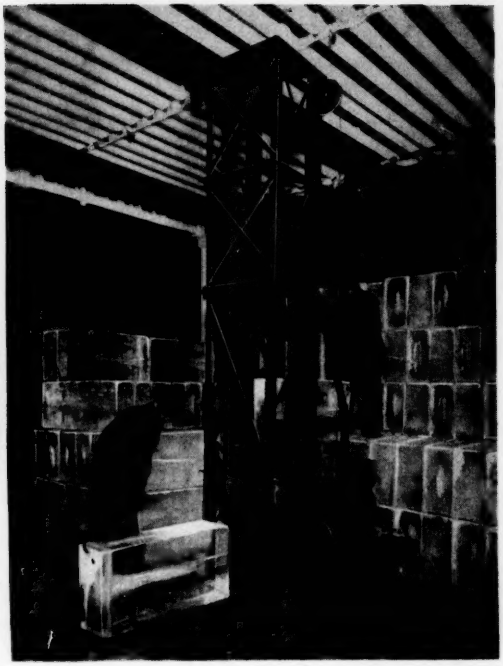
ICING SWEET CORN immediately after harvesting has long been recognized as the only way of preserving its original flavor and freshness. Aimed at development of better handling methods for sweet corn and other vegetables, research projects have been conducted in Ohio. A report on these projects, with special reference to sweet corn is given in the article on page 34.

ACTIVATED CARBON air filters for use in deodorizing cold storage rooms. particularly to forestall absorption of odors by shell eggs. have long been used by British refrigerated warehouses. Now the British Ministry of Food has issued some information on this subject which is covered in the article on page 47.

MODERN HANDLING equipment has been installed in The Borden Company warehouse in the New York Central freight terminal in New York City. Although it is a multi-floor operation the use of elevators, fork trucks and pallets have produced reduction in costs and more speed in operation. For story and pictures see page 53.

THE PRESENT STATUS of ozone, pertaining to its maximum permissable concentration for non-continuous occupancy, is discussed in the article on page 55. Other points considered are its characteristics and chief commercial uses, possible toxicity and its dependence upon moderately high relative humidity.

CANDIES may be held in refrigerated storage, with good results according to report on studies made at the Georgia Agricultural Experiment Station and presented at the annual convention of the National Association of Refrigerated Warehouses. Details are given in the article on page 57.



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ICE EXTENDS STORAGE OF GRAPES

The need for grower-operated houses for refrigerated storage of grapes located at or near ranches or shipping points has opened up a big market for ice in California

J. C. REAR
Vice-president Union Ice Co.
San Francisco, Calif.

THE California grape harvest is big business; it is a multi-million dollar deal. It is one of the largest industries in the state and great care and thought have been given to the methods used in the cultivation, harvest and packing of grapes.

After harvest, they must be carefully culled and packed and they have to be gassed. A very important factor in the successful storage of grapes is the gassing of the grapes with sulphur dioxide. This is done in order to control the formation of bacteria on the stems and on the tender surface of the grape that may cause spoilage. It is a prophylactic action and after gassing the grapes must be placed in a clean, pure atmosphere and precooled. They should be cooled as quickly as possible to at least 40 degrees; lower than that is advantageous but not essential.

Early cold storage rooms were refrigerated with ice, 1890 and before. Then machines took over. Now ice is coming back into use for certain purposes as described in this article. Here it serves a dual purpose of rapid precooling followed by holding of the grapes harvested later.

The grape harvest in California comes on at a very high rate. When the grapes mature, they must be harvested very rapidly. If no storage were provided the grapes would cause a glut of the market and shippers would sustain large losses. Certainly, the shippers would lose a great deal as the price of the grapes would go down.

Cooler Storage Increased

Consequently, there has been a large development in cooler storage throughout the state to hold the grape harvest when it comes on; for example, there were some 5,000 cars of grapes in storage in the northern part of California on December 1.

For the past several years, there has been an increasing need or desire on the part of the growers to have what might be called grower-operated storage houses located directly on the ranches or close to the packing house or the shipping point.

These have many advantages to the grower in that he can accumulate varieties for shipment and make up mixed cars. He can hold back shipments if there is a glut on the market, and carry his fruit over; also, he can precool thoroughly. If he only wants to precool, by getting his fruit in a house precooler on the ranch he can do a much better or more thorough job of precooling than by other means, such as car cooling, so there is a very great interest among growers in having their own storage plants.

Exterior view shows the general design and construction of the plants.

Market for Ice

This has opened up a wide and fertile field for the iceman because ice refrigeration is a natural form of refrigeration for use in this type of plant. In the first place, the storage period is generally short—three to four months at the most. By using ice, it is not necessary to make an investment in an engine room, and no trained engineers are required to operate the plant. There are also other advantages:

There is no hazard from freezing damage or from ammonia leaks in the plant that might cause loss of the grapes. The installation is relatively cheap; investment cost is less than for a large mechanically refrigerated storage. It is also simple to operate. Anybody can learn to run an ice refrigerated plant in a very short time, there is no special training required. The plant is normally trouble-free; there is nothing to go wrong with it other than the air circulating fans, and, of course, ice maintains the temperature and humidity at the most desirable point.

From the standpoint of the ice company, ice refrigerated cold storage plants are easy to design, they are simple to build, and they are simple to operate. It is not difficult to sell the idea to a grower. There are so many advantages in favor of the ice refrigerated plant that we have been amazed ourselves at how easy many of these have been to sell to shippers and growers.

Fifty-three Use Ice

At the present time, there are about 53 plants which have been built in California during the last 15 years. The bulk of these are used primarily for grape storage. However, they also are used for other commodities such as apricots and pears, and several plants are being used for cannery fruit. One plant has been built for cannery fruit exclusively in San Jose. There are a number of plants which have been built for vegetables only, and just this year a plant was constructed for citrus fruits.

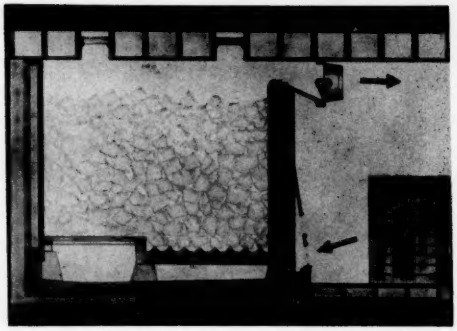
It would appear that while grapes presented the first opportunity for us to sell these plants, the field is now

Four pre-cooler-storage rooms are shown in this illustration. Here the ice bunkers are at the end of the two center rooms and air for the end rooms circulates through the same bunkers by means of ducts. These ice refrigerated plants are simple to operate

almost unlimited. Ice cooled plants can be sold for virtually any perishable commodity that is shipped.

Figures Show Volume

A few figures might be of interest here. The 53 plants built to date have a capacity to precool about 600 cars of merchandise per day. It was pointed out that there were about 5,000 cars of grapes in storage on December 1 in northern California, and there is about 1,200 cars of storage capacity in these ice precooled plants, which is therefore about 25 percent of the total.

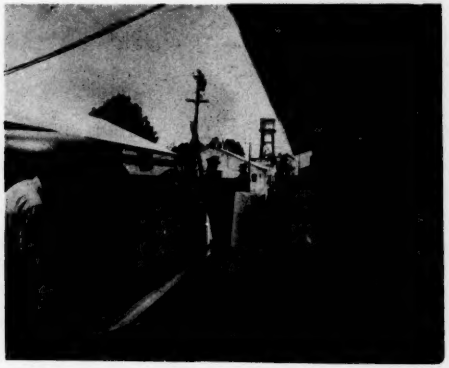


A cross-section illustrates one ice bunker arrangement. The icing hatches are in the top at left. Arrows indicate the path of air circulation, from the propeller type fan out over the boxed fruit and back beneath the ice grid. In many plants the ice bunker is built under the platform and the air goes up to the fans and back to the ice through vertical ducts. The close contact of the air and ice gives an excellent air-washing action.

Construction view down the corridor of one of the new pre-cooler-storage plants. The length of the corridor gives some indication of the plant size. Note the large doors for palletized handling.

Another factor is of considerable interest: The plants which have been built represent an investment that is in excess of a million and a half dollars. In other words here is a group of shippers and growers who are pretty hard headed people and yet who have

Interior of a loaded storage room where ice provides refrigeration plus a vitalizing factor that has made Flame Tokay grapes a storage commodity. The stacks are stripped and boxes are in straight vertical rows to permit good air circulation.



The ice truck is delivering its load to a pre-cooler-storage. Here the ice bunker is beneath the loading platform and the chunks of ice drop through hatches with a minimum of handling from the truck to the bunkers.

thought well enough of ice refrigeration to spend a million and a half dollars of their own money on these plants. We haven't financed these plants for them. We furnished plans in some cases, and in some cases the customer has hired an architect. By and large, they have invested their own money in them, although the R.F.C. has financed one or two.

Costs

An interesting fact is cost of the plants. Recent estimates indicate that these plants are being built today for around a thousand dollars a car of storage capacity. This is just an approximate figure and varies somewhat according to design of the plant. The initial icing capacity of these plants, namely the amount of ice required to ice them up, amounts to nearly 35,000 blocks or 5,000 tons.

You might ask, how does the cost run in competition with mechanical plants? What is the comparative operating cost? Without going into detail but in round figures, it costs about three cents a package to precool. That is the growers' estimate, not ours. This figure has been developed by a number of the shippers and growers using the plants. After precooling, it then costs about three cents additional per package per month for storage. This doesn't represent investment charges or overhead, but it does include the direct operating cost of the plants.

From the standpoint of the ice company, what does the deal offer? To illustrate: A 50-car capacity house normally has a precooling capacity of about half its storage capacity, so it would have around a 25-car per day precooling capacity. Assume that it only cooled about 20 cars a day, the income to the ice company from that one plant would run around $600 a day for ice. After the precooling period was ended, the ice cost for storage would run in the neighborhood of $1,500 a month, assuming the plant was kept filled.

Customer Satisfaction

As far as customer satisfaction is concerned, it is only necessary to visit any of these plants to learn the regard that the customers have for the plant. They seldom experience any serious troubles, and examination of the grapes in storage shows the high quality maintained. The bunches are snug and the stems are green. The fruit is firm and sweet. There is no withering or dehydration. Inspection shows that ice refrigeration certainly does something more than just keep the grapes cold.

Another proof of the customer interest in ice cooled storage is to be found in the little town of Lodi, for example. That is where the Flame Tokay grape is grown and shipped. In the Lodi area there are a total of twenty grower owned and operated precooling and storage plants. Of these twenty plants only two are mechanically refrigerated. Eighteen of them operate on ice refrigeration exclusively. These are not part ice and part machine, they are exlusively ice. Of the two mechanically refrigerated plants in the district, both have had mechanical breakdowns within the past two years which have resulted in the loss of much fruit in each case.

The simplicity and reliability of the ice system appeal to growers but in addition they like the way it takes out field heat and holds the fruit in fresh condition for long periods.

In other words, the shippers are not able, in many cases, to satisfactorily operate a mechanical plant. It is evident that machine refrigerated cold storage plants can't operate on a part-time basis with packing shed help. Trained men are required and most shippers will not employ trained help on a three or four months' basis, so the mechanical plant is at a real disadvantage.

Of the 53 plants that are operating, to the best of my knowledge, only two have been converted to mechanical refrigeration. Of these two, one was located at Brentwood, built in 1936 or 1937 for a large packing company. It was operated quite successfully by them for six or seven years until they sold out their business to a large group operation. With the change in management, the new company thought they would like to go to mechanical refrigeration so the plant was converted and ran about four years, I believe, on mechanical refrigeration. Four years was just long enough to convince the new owners thoroughly they had made a mistake, that mechanical refrigeration was not for them. It wouldn't do what they wanted done to their fruit. This happened to be an apricot and nectarine operation.

About two years ago, the plant was reconverted to ice refrigeration and is operating today on that basis. The manager of the plant is, I think, one of the greatest boosters that we have for ice refrigeration in the territory.

Other Advantages

There are many other advantages. One important benefit is in connection with the gassing. Grapes particularly, as was previously pointed out, must be gassed with sulphur dioxide and have very little tolerance to this gas on a permanent basis. Generally, the gas is introduced, left in the rooms for a short time, perhaps an hour, and then it must be evacuated from the air because grapes, as a living commodity, can't tolerate gas in the air continuously.

Some means must be found to remove the gas from the air. If there is more than a trace of gas left in the air, the commodity will suffer. In mechanically refrigerated plants, experience has shown how very difficult it is to completely evacuate gas from the air even though fresh air is introduced into the house and air washers and other means are used to get rid of it.

In an ice refrigerated house, as soon as the gassing operation is completed, the main fans are started and air again passes through the ice bunker and over the film of water on the ice. Within a short time, an hour or hour and a half, you may walk in the house and can not detect any gas in the air whatsoever. It is completely washed out. The air washing action of the ice removes the gas and impurities and is one of the reasons that fruit keeps so well. The temperature and humidity are important, but so also is the air washing effect. It is the pure, sweet air existing in the house that keeps the fruit in such marvelous condition.

Last year, we tried to find out with the help of a large grower at Lodi how long Tokay grapes could be stored. The grapes were held for eleven months. When these Flame Tokay were taken out after eleven months they were little changed. There was some slight withering on the stem but they were firmly attached, the fruit was sweet and edible and there was no spoilage. This was not just one box, but an entire room full of fruit was held for eleven months. This, we believe, is a conclusive demonstration of the fine results ice refrigeration produces in fruit storage. Remember that agricultural experts rate the storage life of Flame Tokay grapes at 1 month average, 1½ month maximum. Storage with ice can increase this by several times to make these delicious grapes available through many months of the year.

Priority Rating Issued for Maintenance, Repair and Operating Supplies

THE National Production Authority has issued NPA Regulation 4 to give an extendible rating (D O-97) to maintenance and repair parts and supplies to all establishments in the United States including manufacturers, processors, warehouses, retail and wholesale stores and service shops. The regulation is permissive in character. No one is required to use the preference ratings assigned to purchase his MRO (Maintenance, repair and operating) supplies, but if he does so he becomes bound by the limitations of the regulation.

The regulation permits application of the rating, identified as DO-97, by business concerns and other institutions without individual authorization by NPA. The rating may be used solely to acquire maintenance, repair and operating supplies and may not be used to purchase production material (i.e. materials or components to be incorporated in end products) nor to purchase major capital items. The rating is equal to all other DO ratings and is fuliy extendible. Ratings are applied in accordance with the provisions of NPA Regulation 2.

How Rating is Used

When a person applies or extends this rating he must put "DO-97, Certified under NPA Regulation 2" on the purchase order or on a separate piece of paper attached to the order clearly identifying it. The certification must be signed by the person placing the order or by a responsible individual who is duly authorized to sign for this purpose.

If a concern elects to use a DO-97 rating even on a single occasion, it must then limit its MRO purchases in accordance with Regulation 4.

Under the regulation, MRO purchases are limited in any one calendar quarter to one-fourth of the firm's dollar purchases for maintenance, repair and operating purposes in 1950 (or the fiscal year ending nearest to December 31, 1950.) If this quota is too small to provide sufficient MRO supplies, the firm may file with NPA an application for an increased quota.

To provide for seasonal business, the new regulation permits quarterly MRO quotas equal to the amount spent by the business for MRO in the corresponding quarter of 1950 (or fiscal year).

Businesses which were in operation only a part of 1950 are permitted a quota in proportion to the amount they spent for MRO while they were in operation, with reasonable adjustments for seasonal and other variable factors. New firms started after December 31, 1950 are permitted to acquire for MRO purposes the minimum amounts necessary for operation, up to $5,000 a quarter. They must obtain special NPA authorization for MRO expenditures above this amount. When the quarterly quotas for these businesses exceed $1,000, the NPA must be informed in writing of the base period used, the reasons for selecting it, and what adjustments have been made.

Small businesses are permitted to extend DO-97 ratings for MRO purchases up to $1,000 a quarter, without regard to the quota restrictions. All other firms making MRO purchases under DO-97 ratings are required to follow the procedure established in the regulation for figuring their quotas.

In all cases where DO-97 ratings are used to procure MRO supplies, the firm is required to charge against its MRO quota purchases made without use of the rating.

The DO-97 rating is quite high in preference ratings at the present time. The number 97 is purely an identification number and it does not mean that 96 other ratings are ahead of it. The rating is available automatically to all businesses establishments, and public or private institutions that wish to use it for MRO supplies but the rules and regulations should be understood when it is used.

"Maintenance" means the minimum upkeep necessary to continue any plant in sound working condition, and "repair" means the restoration of any plant to sound working condition when it has been rendered unsafe or unfit for service by wear and tear, damage, failure of parts, or the like. Neither "maintenance" nor "repair" includes the improvement of any plant, facility, or equipment by replacing material which is in sound working condition.

"Operating supplies" means materials normally carried as operating supplies according to established accounting practice, and includes items (such as hand tools) purchased by employer for sale to employees, or issued without charge, for use in his business, where they would constitute operating supplies according to established accounting practice.

From the nearest United States Department of Commerce Field Office secure (1) NPA Regulation 4, (2) NPA Regulation 2, (3) NPA—303A (Questions and Answers regarding NPA Reg. 4).

DPA Allocates Funds for Developing Critical Metals

THE Defense Production Administration has allocated $10,000,000 of the funds authorized under the Defense Production Act of 1950 to the Department of the Interior for use in encouraging exploration for strategic and critical metals needed in the defense program.

The funds will be used to assist prospectors and mine operators in searching for and blocking out new reserves of ore vitally needed for the Nation's rearmament program and for essential civilian requirements. The funds will be used generally on a matching basis, with a requirement that private capital be spent prior to or concurrently with the Government funds, and the Government's share would be repayable out of production from successful ventures.

It was pointed out that the program is in accord with the Congressional policy expressed in the Defense Production Act which calls for the encouragement of exploration and directs that actions taken to expand defense activities shall be carried out to the maximum extent possible by private industry.

Officials expressed the belief that the program would relieve shortages of some critical and strategic metals and minerals without diverting unnecessarily either materials or manpower otherwise essential to the defense program.

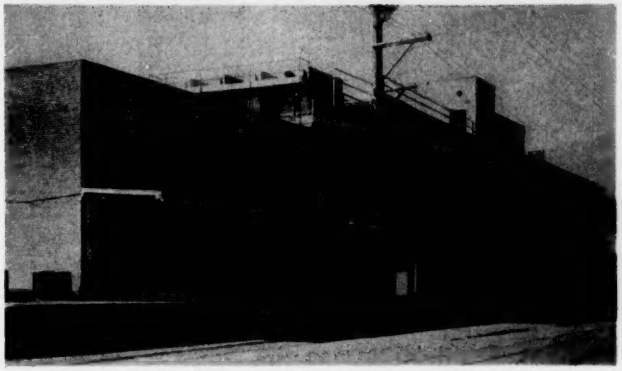
It was also pointed out that an important part of the job of exploring for strategic and critical metals is expected to be carried out by prospectors and small concerns, and that while the program is not designed to benefit any particular segment or industry, small enterprises can in the aggregate make a substantial contribution to the supply of mineral raw materials which the Nation needs.

Currently the exploration program will apply only to the following: Antimony, asbestos, beryl, bismuth, cerium (and rare earth ores), chrome, cobalt, columbium, copper, cryolite, fluorspar, graphite (crucible flake), kyanite and other mullite refractories, lead, lithium, manganese, mercury, mica (strategic grade), miscellaneous ferro-alloy ores, molybdenum, monazite, nickel, tantalum, tungsten, sulphur, and zinc.

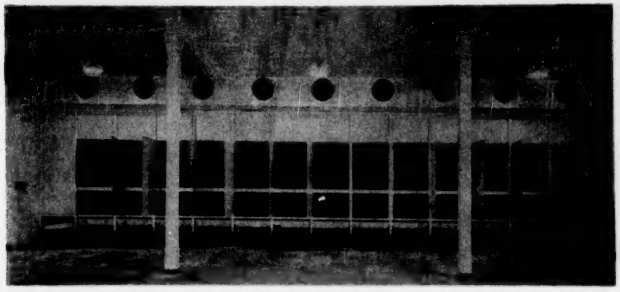
Expansion and Modernization Program Produces Up-to-Date Ice Making and Cold Storage Plant

THE Crystal Ice and Cold Storage Company of Sacramento, California, has completed a four year expansion and modernization program at a cost of approximately $500,000. The company's facilities as they stand today is a good example of how a modern all purpose refrigeration plant can be designed around a small outmoded plant.

The company was founded by R. H. Carstensen in 1910, when a twenty ton ice plant was constructed for the primary purpose of supplying ice to establishments operated by the founder. In 1920 the company was moved to its present location on R Street between 16th and 17th Streets. Some additions were made during the years from 1920 to 1947. In 1947 when A. R. Carstensen, the son of the founder, became president of the corporation the plant facilities consisted of a sixty ton ice tank and 210,000 cubic feet of cold storage space. The original structural strength of the second floor was such that the floor load limits were below that required for mechanized handling.



Side view of modernized plant of Crystal Ice & Cold Storage Company, Sacramento, Calif.



Refrigerated room with forced air ducts. Note air vents at top, and large booster circulating fan at upper right.

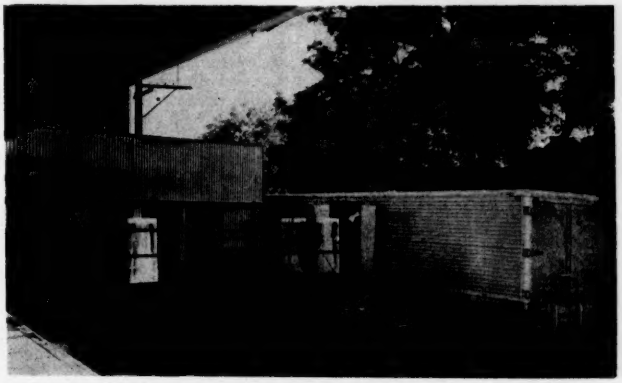
Modernization

During 1947 approximately $100,000 was spent modernizing and increasing the refrigeration capacity of the engine room, replacing an inadequate freight elevator, replacing the wood beams with steel beams and the replacement of pipe in some of the existing cold storage rooms. During this year two new rooms with a capacity of twenty cars each were added on the ground floor.

During 1948, three new rooms of reinforced concrete construction were added with a total capacity of fifty cars. In 1950, a second floor was constructed on this portion of the building. The three rooms on the second floor increased the plant capacity by sixty-two cars. Also during 1950 one new room was added on the ground floor with a capacity of ten cars.

During the four year expansion program approximately $50,000 was invested in forklifts, transporters and pallets.

At the present time the plant facilities consists of a sixty ton ice tank and approximately three-quarters of a million cubic feet of refrigerated



Loading block ice in truck. This truck, designed by the Utility Trailer Co., Oakland, Calif., has an all-aluminum body. Note conveyor for block ice.

Piling packages with fork lift truck. The entire storage area of this plant is palletized for mechanical handling equipment.

space with a capacity of approximately 235 cars. The entire cold storage area is palletized and mechanical handling equipment is utilized for the handling of all commodities.

Three rooms with a capacity of thirty cars are designed for the storage of commodities requiring cooler temperatures only. The remainder of the rooms are designed for temperatures ranging from –10 F to 40 F. All of these rooms are heavily coiled and are adequate for the pre-cooling of fruit as well as holding at cooler or freezer temperatures. One room is designed for fast freezing twenty-five tons per day.

The cold storage rooms have variable forced air circulation and automatic temperature and humidity controls. Belmont controls in conjunction with solenoid valves control the liquor feed and Hubble valves control the back pressure.

Forced Air Circulation

The eighteen storage rooms in the plant vary in size from eight to twenty-five car capacity. The piling height varies from eight feet to eighteen feet. The variation in the size and height of the rooms enables the handling of a greater variety of commodities under ideal conditions.

The refrigeration system and the warehouse area is designed to give the warehouseman the greatest possible flexibility of operation. During the late summer and early fall of 1950 over nine thousand tons of fruit was pre-cooled and stored. In the late fall and winter months as the demand for cooler storage decreases, rooms as needed are converted to freezers to accommodate the heavy demand for freezer storage space. In the spring when the demand for storage space slacks off, some of the rooms are used for the storage of ice to take care of the heavy demand during the summer months.

The Phillips Refrigeration Co. of San Francisco is the designing engineers of the plant.

The company sells ice to a delivery company in Sacramento and to growers and shippers in the Sacramento area. The company also operates a car pre-cooling department and renders a complete car pre-cooling service throughout Northern California.

The plant is serviced by a private railroad spur with a six car capacity, and a truck platform with a capacity of twelve trucks.

Canvas Tunnel for Loading Potatoes

IN BELOW zero winter weather it has been almost impossible to move Red River Valley potatoes from warehouse to railroad cars because of freezing damage to the potatoes in the process. Now, research scientists of the U. S. Department of Agriculture, working at East Grand Forks, Minn., have developed a canvas tunnel that fits between warehouse door and railroad car door, so that the potatoes can be moved without damage during below zero cold. Temperatures in both the cars and the warehouse are kept above freezing.

The seriousness of the problem is indicated by the fact that it is often impossible to load potatoes on more than half of the days during the winter months. That means growers are unable to fill orders and lose sales. Shippers are forced to stop grading and to lay off working crews. Railroads have sidings full of unwanted cars and are often unable to handle the accumulated business when the weather moderates.

Developed under provisions of the Research and Marketing Act of 1946, the tunnel is a weather-resistant connection between warehouse door and refrigerator car door. It is permanently attached to the warehouse and can be quickly fitted into the car doorway by means of an adjustable frame. The tunnel can be designed to fit any size doorway, although a 27-foot circumference will let it fit any standard doorway, varying from 48 to 79 inches in width and 78 to 96 inches in height.

The research men recommend construction of the tunnel from 15-ounce or heavier canvas and suggest using an additional foot of canvas between warehouse and car, with the edge rolled over rope, to prevent the canvas pulling out between the car doorway and frame.

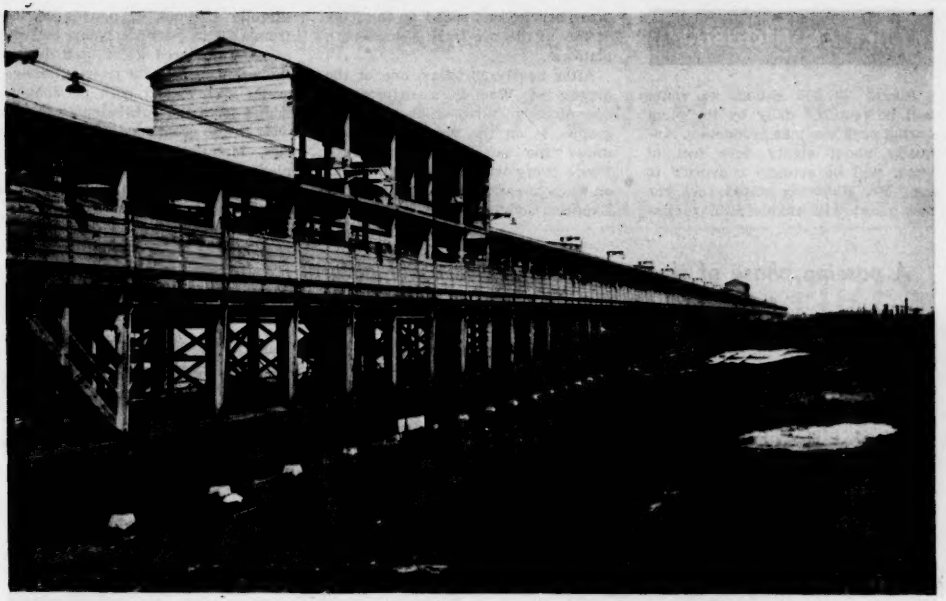
The use of such a tunnel increases the hazard of carbon monoxide fumes when charcoal burners are used in the railroad cars. The designers of the tunnel suggest that an opening be left between the tunnel frame and the doorway top, and that two or three men work together for safety's sake.

Cold Storage Advisory Committee Meets

THE Cold Storage Advisory Committee of the United States Department of Agriculture met in Washington, January 30-February 1. Top recommendation of the committee was development of additional frozen concentrated juices and dehydro-frozen foods which might be useful to the military. Priority was also given studies on the effect of fluctuating temperatures on frozen foods. Other recommendations were establishment of low temperature research laboratory, seed storage studies, packaging studies, continuation of work on frozen milk concentrate, frozen poultry and pre-cooked frozen foods. Paul B. Christensen and H. C. Diehl were reelected chairman and vice-chairman respectively, of the committee.

Materials Handling Show

THE fourth national materials handling exposition will be held in Chicago April 30 to May 4. The afternoon of May 2 will feature a session on Industrial Warehousing. The American Warehousemen's Association will be well represented at this session when A.W.A. president, J. Leo Cooke, speaks on the subject "Equipment Selection Factors."



Icing platform of Pacific Fruit Express at Laramie, Wyoming, which will be supplied with ice from the new million dollar ice plant.

$1,000,000 ICE PLANT STARTED

New modern ice plant will be built at Laramie, Wyoming by Pacific Fruit Express Company to supply ice for refrigerator car icing. Will replace natural ice operations.

PLANS for a million dollar ice plant at the Pacific Fruit Express Company's Laramie, Wyo., railroad refrigerator car icing facilities have been announced by K. V. Plummer, vice president and general manager. Pacific Fruit Express is jointly owned by Union Pacific and Southern Pacific railroads. Work on the project was scheduled to begin in April and completion is expected by early fall.

An important Pacific Fruit Express point on Union Pacific, the company since the war constructed one of two of the world's largest double-deck icing platforms there. The other 100-car double-deck icing platform is located at El Paso, Tex., on Southern Pacific lines.

The new project includes the installation of refrigeration equipment in existing ice storage houses at Laramie and the erection of a one-story 96-foot by 180-foot reinforced concrete building to house the most modern of ice manufacturing equipment. Newly-designed ice delivery facilities for moving ice from storage rooms to the icing platform will also be installed.

All Manufactured Ice

Whereas natural ice from nearby ponds was previously used, the new plant will manufacture sufficient ice for the 70,000 refrigerator cars that halt at Laramie annually for reicing. The plant will have permanent storage space for 40,000 tons of ice and daily storage space for 800 tons. Production capacity of the new plant is 400 tons daily. The company's ice requirements during the peak season in August and September exceed 1,000 tons daily.

Several reasons are cited for the company's decision to convert to manufactured ice at Laramie, location of the last PFE natural ice plant on the Union Pacific. Included were the high labor cost of handling natural ice and the necessity to ship 40,000 tons of manufactured ice annually to Laramie to supplement the local harvest.

Commenting on the purity of manufactured ice, Mr. Plummer pointed out that since Laramie is the principal point on Union Pacific for the application of fresh retop ice on perishable shipments it was the desire of the company to provide the purest ice possible.

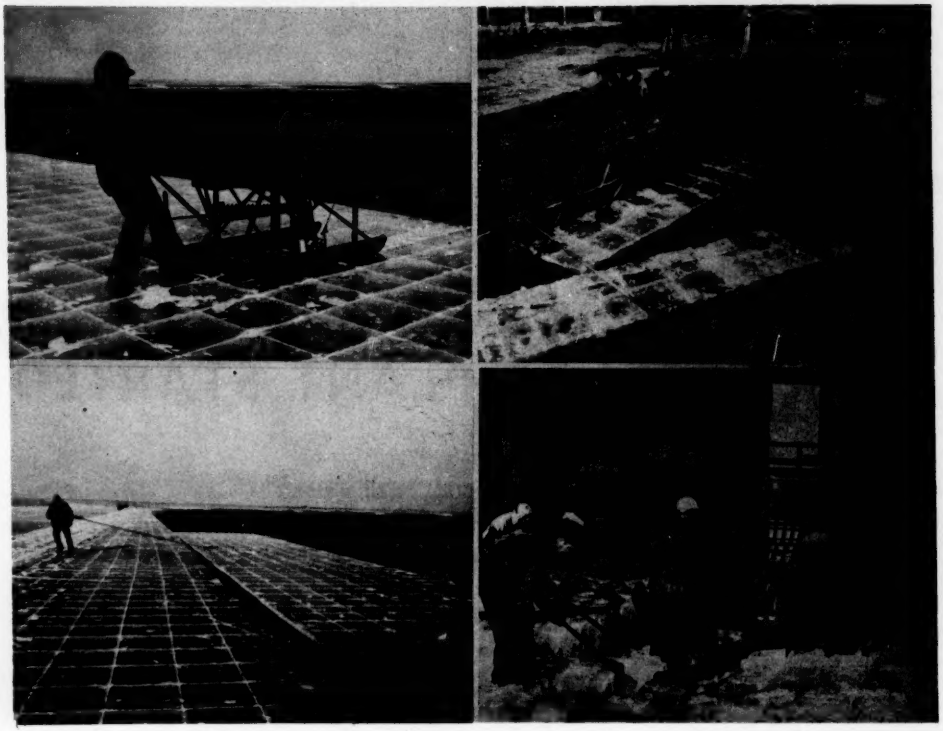
He added that consideration was given to locating the plant at other points on Union Pacific, but because of facilities existing there it was decided to construct at Laramie. The PFE payroll there has averaged $650,000 annually for the past five years.

The Ice Industry

Almost 200,000 gallons of water will be required daily by the plant during peak summer production. Annually about eighty acre feet of water will be actually converted to ice. Mr. Plummer stated that the new plant will enable PFE to improve service and speed up the icing of cars at the two-track 85-carlength platform.

After nearly 30 years, one of the biggest of Wyoming's natural ice operations, pictured in these photographs, is on the verge of melting under the sunshine of progress. Twice every winter for three weeks on each occasion, the Pacific Fruit Express Company has harvested literally millions of pounds of ice from a 20 acre artificial pond at Laramie. The stored ice is used during the warm months for re-icing refrigerator cars loaded with perishables bound from the garden spots of the west to the great food centers of the east. Manufacture of ice at the new plant will mark the passing of one of the largest natural ice harvesting operations in the country.

A passing phase of the ice industry — views of natural ice harvesting operations by Pacific Fruit Express Company at Laramie, Wyoming.



Upper left: A gasoline-driven machine is sawing through the ice. Another machine has already scored the frozen surface.

Upper right: A workman is using a long hook to drag a scored ice raft to the storage house. The raft is 8 cakes wide, 40 cakes long, and since each cake weighs about 225 pounds, the weight of the raft is over 70,000 pounds. The cakes are 22 inches in width and 22 inches in length; the depth varies. Workmen wear cleats strapped to their boots for safety and leverage and to stand against the Wyoming wind.

Lower left: A raft is being broken into individual cakes preparatory to floating through the canal leading to the conveyor belt feeding the storage house. Two hundred workmen in an eight-hour-day will harvest and store 2,500 to 3,000 tons of ice.

Lower right: Ice cakes slide down the conveyor into the storage house to await warm weather and the yawning bunkers of thousands of refrigerator cars. Sixteen rooms in the storage house hold 4,300 tons each and thousands of additional tons are stacked outside. A season's total exceeds 80,000 tons of ice.

APRIL—NATIONAL REFRIGERATION ★ SAFETY MONTH ★

Safety in Refrigeration Pays All-Ways Every Month in the Year

PREVENTING LOSSES FROM FIRES

Fires in refrigeration plants cause staggering losses each year although fatalities and personal injuries are low. Knowing causes and preventative measures are important.

WILLIAM OSBORN
Safety Engineer, California Consumers Corp., Los Angeles, Calif.

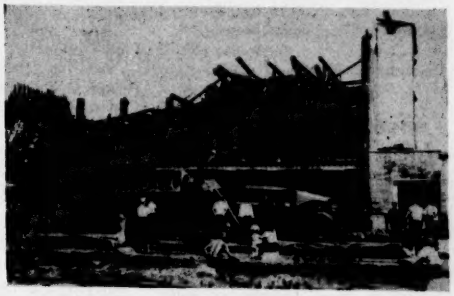
AS A safety engineer it is most gratifying for me to note the emphasis N.A.P.R.E. is placing on accident prevention work. It brings home the apparent truth, that the refrigeration industry, like industry in general, is becoming ever more conscious of the job to be done in accident prevention work. We are finally recognizing the terrific toll being taken each year and the most important thing of all, that we can do something about it.

Fire prevention is one phase of our safety program, and to me one of the most important. Although fewer fatalities or personnel injuries occur in our industry because of fire, as compared with other classes of accidents, we can safely say that no other form of accident accounts for such a staggering loss each year to buildings and plants. Last year alone fire losses amounted to $652,000,000. And you can bet that the refrigerating plants throughout the nation contributed their share of that loss.

We are all practical people, so a good point to remember is that when your workshop goes up in flame your job may go with it. History of industrial fires prove that more than 40 per cent of plants destroyed by fire are never rebuilt. This is brutal, but true. Therefore, we, as practical engineers should be aware of the basic fundamentals of fire prevention. I don't mean that each of us should take a full-fledged firemen's course, but we should be conscious of fire causes and methods of prevention.

First, it is important to know the causes of fire. You've all heard the story of how the open flame of an oil lamp, kicked over by Mrs. O'Leary's cow, started the great Chicago fire seventy-nine years ago, and you probably think of open flame as causing most disastrous fires.

However, the history of industrial fires proves that other causes are responsible for a greater percentage than those caused by matches, cigarettes or open flames. A list compiled by Factory Mutual Fire Insurance Co. points out these three as the largest causes:



Defects in the electrical system were blamed for this fire which destroyed a large section of a refrigeration plant with a total loss estimated at more than one million dollars.

Three Large Causes

First, electricity, although it is such a wonderful servant, is industry's Number 1 public enemy in causing fire. Most of those electrical fires are caused by makeshift setups or improper maintenance by someone who doesn't understand electrical work. For example—running a substandard temporary line, replacing a fuse with one that is too heavy for the line, or overloading a motor. Failure to properly maintain electrical contacts is a frequent cause of fires; and shorting out of old wiring is especially of concern to the refrigeration industry. Know and understand these important causes and be on the lookout for them.

Friction, although an innocent sounding term, is our second largest cause of fires. Friction fires are caused by overheated bearings or machine parts or a belt, rubbing and producing enough heat to burn surrounding material. Often there's plenty of oil around to start a real blaze, but it's not in the bearing where it belongs. The answer is to maintain a good oiling program so these bearings won't overheat, and to remove all excess oil.

Then comes our open flame hazard that we mentioned in relation to Mrs. O'Leary's cow. Such fires are third on the list of causes. The welding torch is the best example of one of the prime contributors in this classi-

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Presented to the 41st NAPRE convention.

fication. Make sure that the work area is fire-safe before any welding is attempted. This is especially true, when welding in attics or other out-of-the-way places in the plant.

These are the three more important causes of fire in industry today—electricity, friction, and open flames. However, in the refrigeration industry we also have the specific problem of working with ammonia gas, which we know is inflammable in concentrations of 16 to 27 per cent by volume — sometimes explosive under ideal conditions. These qualities of ammonia make for an additional fire hazard and emphasize why we must take even greater precautions against fire than other industries.

A recent report from a laboratory investigating a cold storage fire in Fresno, California, which completely destroyed the plant, gave an interesting theory as to the possible causes of the fire. Considering the very rapid spreading of the fire the reporting laboratory considered this chemical reaction to be the cause: Namely, the combination of chlorine, emitted from the sodium hypochlorite used as a cleaning compound on the floor, with ammonia, readily absorbed by the water solution, formed the highly explosive compound nitrogen chloride. Contact with additional ammonia gas would cause the explosion and the liberated hydrogen would support the combustion causing the fire.

Although this is but one isolated case, it does prove that the possibility is there, and that the use of cleaning compounds emitting free chlorine could be hazardous in our ammonia plants when bad leaks occur.

Preventing Fires

Now that we know the basic causes of fire, the question arises, "How can we prevent these fires?" The answer, I believe, is through proper instruction of fire prevention methods and techniques.

Probably one of the most vigorous campaigns ever carried out in this field is in our own U. S. Air Force. They recognize the value of safety instruction, in all phases, and leave no stones unturned in putting over their program. After all, when they lose an aircraft or a pilot and a crew, it is not only the lives of the individuals, a cost which can't be replaced, but when the entire crew is saved and the plane lost, it still means a terrific cost in dollars and cents. A half million dollars is only the beginning with some of the larger planes.

As an illustration of the extent they would go in the Air Corp to forward proper safety prevention techniques I'm reminded of a personal experience that occurred to me during primary training at Santa Maria. It had to do with the wearing of safety belts. We were flying the open cockpit type aircraft at the time, and it was very important that our safety belts be fastened at all times. Apparently, the hazard didn't impress me, and I continually forgot to secure my belt.

Fire Causes

The most prolific source of fires is faulty electric systems and equipment. Few people realize this hazard and it results in many fires.

Friction-overheated bearings, rubbing belts and parts are the next fire leader.

Then comes the cigarette, open flame, welding torch. The latter caused the fire that destroyed that gigantic ocean liner, the Normandy.

My instructor had reminded me on several previous occasions and taken great pains to explain the reasons behind his request. But still I wasn't impressed. About half way through an instruction period, and on a day when he had again warned about the safety belt, with no warning whatso-ever he rolled the plane on its back. My safety belt wasn't fastened. Believe me, if I've ever been impressed by the reason for a safety precaution it was then — 3,000 feet above the ground, hanging on to the edge of the cockpit. I never again forgot to fasten that safety belt.

We need not, and cannot use such strenuous methods in our fire prevention instruction, but in most cases we can do more than we are now doing.

The most important factor in fire prevention is that we all know and understand the types of fire fighting equipment and how to use them. It is with such equipment that we are able to kill the little fires before they develop into a serious loss. The best way to learn is through actual experience.

This calls for the setting up of an annual fire prevention demonstration in our plants, a time when all personnel concerned may have the opportunity to actually use a fire extinguisher on a real fire. I consider such a program the hub of any plant's fire prevention instruction.

Demonstration Program

The annual demonstration lends itself very easily to your fire extinguisher recharging duties, because most all extinguishers should be checked and recharged at least once a year.

Briefly, this is the way to set up a demonstration program:

Each year when it comes time to recharge the extinguishers, get as many of the men together as possible, along with all available fire protective equipment that you can spare, and adjourn to an open and safe space at, or near your plant. It's always best to check first with your local fire department, who are always very much interested and cooperative toward such work carried on in the industry.

At the predetermined location have an open trough with several square feet of area filled with about six inches of water, several gallons of gasoline and a good sized pile of rubbish.

When you get to the location, spend the first few minutes in explaining the three types of fires and what extinguishers are best for each.

Explain first the Class A fire, which includes such things as paper, wood, cloth, and rubbish pointing out that the quenching and cooling effect of water is required. The soda–acid and water pump type extinguishers are designed for such fires.

Second, the Class B fires which involve burning liquids such as gasoline, oil, or paints. Such fires require a smothering type action. Dry chemical, carbon dioxide, vaporizing liquid, or foam type extinguishers lend themselves to this requirement. Water, merely spreads the Class B type of fire.

Class C fires are those including live electrical equipment such as motors, switches, and appliances. A nonconducting extinguishing agent is required such as carbon dioxide, dry chemical, or vaporizing liquid. Stress the importance of first turning off the electrical power before attempting to extinguish the flames.

After this very important preliminary proceed to explain the operation of each type of the available extinguishers. Then ignite the rubbish to simulate a Class A fire and allow each man to actually use one of your soda and acid or water pump type extinguishers on the fire.

Then pour a quantity of the gasoline on the water in the trough and light it. Quickly show the spreading effect of a stream of water on the flames, then allow the men to extin-

(Continued on page 62)

APRIL—NATIONAL REFRIGERATION ★ SAFETY MONTH ★

Safety in Refrigeration Pays All-Ways Every Month in the Year

INDUSTRIAL ACCIDENT PREVENTION

Prevention of industrial injuries is based upon investigation and analysis of causes of accidents. When this is followed and remedies applied, desired results will follow.

LEE B. JOHNSON
Safety Engineer,
Northrup Aircraft Inc.
Hawthorne, Calif.
Chairman, Los Angeles Chapter
American Society of Safety Engineers

AN efficient approach to the prevention of industrial injuries is through the plan of investigating and analyzing the causes of all accidents. According to authoritative accident prevention specialists, out of unit groups of several hundred accidents of the same kind and involving the same person, only one-tenth of the accidents will produce minor injuries, with possibly one major injury, and ninety percent of the accidents will not produce any injuries. In other words, if a person continues to perform the job the unsafe way, he may do so for more than 300 times before he might cause an injury to himself or to someone else. Therefore, it is important to consider causes of accidents and not causes of injuries.

Webster defines the word "accident" as "an event that takes place without one's foresight, etc." Webster's definition would lead one nowhere in learning about the kind of accidents that we want to prevent in industry. The more practical definition for the word "accident" for the purpose of accident prevention would be: "an event or incident which causes an interruption in an orderly progress." For an example; a hand truck loaded with boxes goes through the plant and one of the boxes drops off and strikes the floor without causing an injury. Here the orderly progress in question was disrupted by an accident.

The word "cause" means that which occasions or effects a result, and there might be several causes of any one accident. There is always a basic, direct or proximate cause of every accident, and these causes will fall into two categories: Personal unsafe acts and mechanical or physical hazards.

As in mathematics, there are theorems in accident occurrence: A personal injury occurs only as the result of an accident. An accident occurs only as the result of a personal or mechanical hazard. Personal and mechanical hazards exist only because of the faults of persons. Faults of persons are inherited or acquired by environment.

The accident prevention program is just as important as the production program. A well conducted safety activity gives valuable results just as surely as production engineering and control increase output. Conversely production usually suffers when accidents go unchecked. Present day work to prevent accidents and injuries is based upon a half century of experience which has fully demonstrated the results to be obtained.

Industrial accident statistics show that 88 percent of the accidents are caused by unsafe personal acts and 12 percent are caused by mechanical or physical conditions. The greatest problem the safety engineer is faced with today is to determine ways and means which will help control the behavior of people so they will not commit unsafe acts. Some effective controls have already been very successful and they will be discussed later in this paper.

The sequence of an accident can best be explained by the demonstration of these five large dominoes: No. 1 domino represents an employee who has inherited or acquired by an environment of recklessness or laziness a willful disregard for his own safety or the safety of others; No. 2 domino represents the faults of the person involved in the accident; No. 3 domino is the unsafe act or mechanical or physical hazard. (Example: An unguarded ice scoring machine or the employee failed to stop the machine when dislodging a cake of ice from a scoring machine.) No. 4 domino is the accident; No. 5 domino is the injury.

When the five dominoes are placed on end accordingly, the No. 1 domino, representing the environmental or inherited factors tips over striking No. 2 causing a fault or faults of a person, and No. 2 tips and strikes No. 3 domino which developed the unsafe personal act or unsafe physical or mechanical hazard, thus causing the hazard domino to produce an accident, and this domino in turn tips over striking the No. 5 domino which produces the injury.

If a guard were placed on the machine or the employee stopped the machine, we would remove the hazard domino. Thus, the No. 1, environment or inherited factor, domino tip over and cause No. 2, fault domino, to tip over, there could be no accident as the hazard has been removed.

Up to this point you will note that there has been no mention of industrial accidents being caused by the employee's carelessness. The word "carelessness" is meaningless, and it should never be used to describe the cause of an accident as it would lead

Presented at 41st N.A.P.R.E. convention.

Those accidents caused by mechanical or physical hazards:

Inadequately guarded
Unguarded
Defective condition
Unsafe design or construction
Hazardous arrangement, process, etc., piling, storage, aisle space, exits, layout, overload, etc.
Unsafe illumination
Unsafe ventilation
Unsafe dress or apparel
Unsafe methods, processes, procedures, etc.
Operating without authority, failure to secure or warn

Personal Unsafe Acts:

Operating or working at unsafe speed
Making safety devices inoperative
Using unsafe equipment, hands instead of equipment, or equipment unsafely
Unsafe loading, placing, mixing, etc.
Taking unsafe position or posture
Working on moving or dangerous equipment
Distracting, teasing, abusing, startling
Failure to use safe attire or personal protective devices

Sub-causes (Personal) "Faults of persons," reason why safe practice rules are violated:

Improper attitude—willful disregard, reckless, lazy, disloyal, uncooperative, fearful, etc.
Lack of knowledge or skill—insufficiently informed, inexperienced
Physically unsuited— hearing, sight, age, sex, height, ill, allergic, slow reaction, etc.
Improper mechanical or physical environment—space, light, heat, arrangement, ventilation, materials, tools, equipment, procedures, company policy, routing, etc., makes it awkward, difficult, inconvenient, embarrassing, or impossible to follow safe practice rules.

one nowhere in selecting a corrective measure or device to prevent the reoccurrence of accidents. There is always a more basic cause of accidents, as previously stated.

To Prevent Accidents

The evaluation of the safety exchange in the aircraft manufacturing industry as it applies to job methods, statistics, machine guards, case histories of accidents, safety educational material, showed that it assisted in production increase and, at the same time, reduced accidents causing injuries by 54 percent. This was a very simple plan; i.e., if a plant discovered a new effective way to guard a punch press or saw, the idea was passed on to other aircraft manufacturing companies.

This conforms to the safety engineer's unwritten law, "Safety ideas which will save a life or prevent injuries should not be copyrighted but passed on where they will continue to produce more efficient industrial operations." This type of safety exchange is recommended for any type of industrial agency or association for obtaining better results in reducing accidents to the irreducible minimum.

Another effective method recommended for use in accident prevention work is the appointment of a safety committee. Members of this committee should be selected from the shop employees, supervisory personnel and top management. In the State of California, it is possible for certain industrial plants to earn up to 10 percent credit on their annual workmen's compensation insurance premium. This credit is proof that safety committees reduce injuries. Similar benefits are available elsewhere. If interested, you should contact your insurance company.

Many companies get the best results out of their safety committees by inviting the members of all three groups—shop, supervisory and executive personnel—to sit together in a round table discussion type of safety meeting. The members of the shop committee should be appointed on a rotation basis for a two or three month period, thus stimulating more safety thinking among all employees. This type of a meeting will be just as effective as the members of top management want to make it. Results will be according to the interest shown by management in the accident prevention program.

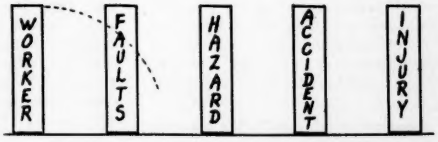
I would like to repeat a story as told to me by a friend who is safety engineer for an insurance company—a story that brought results. —This safety engineer was attending a safety committee meeting of a rather large industrial plant. This was a regular monthly meeting and the group met for two hours. The first 1½ hours are always devoted to production problems, tools, materials, and the safety problems of the plant were discussed the last half-hour of the meeting. At this particular meeting, after the production subjects were discussed and the chairman announced the safety part of the agenda was open for business, the factory manager of this company got up and left the meeting, supposedly thinking he had greater problems back at his desk.

My good friend, the safety engineer, said that the last half-hour of this meeting was left flat, with very little being accomplished. After the meeting, the safety engineer walked into the Factory Manager's office and in a very tactful way told the factory manager that when he walked out of the meeting without staying for the part that would help prevent accidents in his plant, his action signified to the rest of the plant that top management was not interested in preventing accidents.

After being enlightened on his psychological error, the factory manager acknowledged that he did not realize that the safety meeting needed his participation. My friend told me later that this manager's attention at the recent safety meetings has been the cause of a great reduction in accidents in that plant.—The moral of this story is, "A safe plant is within the economical reach of any industrial management, but it takes executive determination to get it."

Investigate All Industrial Injuries

Oftentimes, a first aid case which was not a fatality or serious injury is just a matter of luck. I would like to cite an example of an accident which occurred at a shipyard in Long Beach during World War II. A large Gantry crane dropped a two-ton steel plate and the edge of the steel plate just barely tipped a worker's hard



Remove one of the primary elements and the injury will not occur.

hat, and the hat passing his ear caused a superficial cut. The worker reported to the dispensary for first aid treatment. The safety engineer reviewing the causes of first aid and other cases that day noted this particular case on the hospital report. He investigated this case to determine why the steel plate fell from the crane. The investigation led to correcting faulty rigging gear which caused just a first aid case.

The working tradesmen, mechanics and clerks, etc., can almost always prescribe or recommend methods or ideas on how to correct unsafe acts or physical hazards if they are given the chance. Once the working force of a plant is given an opportunity to use their initiative in selecting remedies for accident causes, the workers will subconsciously sell themselves a bill of goods to work safely and to assist others.

Training Aids

The National Safety Council furnishes, at nominal cost to its members and non-members, safety posters, training films, engineering data and detail sheets, and safe practice pamphlets covering the safe procepensation and liability insurance plants. A review of the other aids in this area will show examples duplicated in many other locations. The Greater Los Angeles Chapter of the National Safety Council conducts safety services for industry, schools, home, farm, and fleet operations. The local chapter provides the largest industrial safety contest and the largest fleet contest. Safety contests, when conducted on as large and efficient a scale as the Los Angeles Chapter contests, will assist any plant or operation in stimulating interest in safety.

Safety Advisory Service Available

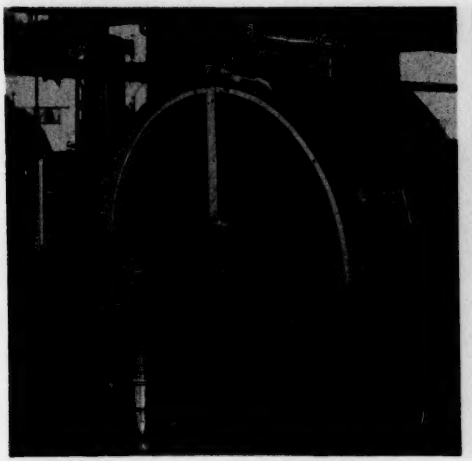
Insurance companies furnish safety engineering services. The larger insurance companies who write a considerable amount of workmen's compensation and liability insurance have a staff of trained safety engineers who will assist their clients to set up safety plans for industrial and fleet accident prevention programs.

The Division of Industrial Safety of the State of California will also furnish safety information for the prevention of accidents. Although this agency is a law enforcement group, they do render valuable safety engineering services.

Also, the Greater Los Angeles Chapter of the National Safety Council has a very capable staff of safety experts who will assist industrial plants in their industrial accident prevention program.

The California Employers Safety Committee was recently organized to furnish safety engineering assistance to small plants in need of assistance in reducing their accident frequency rate. The group is composed of professional safety engineers who have volunteered their services. The California Employers Safety Committee is assisted by the California Manufacturers Association who give their office and staff assistance. This would be beneficial everywhere.

The industrial accident prevention program is best illustrated by a triangle, each side of which represents an important factor of the program. One side is bounded by the insurance company. Their chief interest is maintaining a low loss ratio in injury claims. Their vehicle for enforcement is higher rates or cancellation of policy.



A good guard for a direct connected synchronous motor. It adds greatly to safety during lubrication and other attendance operations.

Flywheel, belts and pulleys are well guarded. This guard costs very little more than rails made up with pipe and fittings and it gives complete protection to workers.

The second side of the triangle is represented by the law enforcement and labor agencies. The California State Division of Industrial Safety interest lies in the enforcement of the California State Industrial Safety Orders. The labor union's interest is in the enforcement of the safe working conditions according to their labor contracts. The vehicle for enforcement by the state authorities is the law enforcement of the state orders, while the members of the unions can require safe working conditions according to the vehicle of power written into their contracts.

Preventing Accidents

The third leg of the triangle is supported by management's will to do a safety job. This can include a safety department and a safety engineer. The interest of management is to develop and put into real practice the most sound and practical accident prevention program that will keep accidents to the lowest possible num-

(Continued on page 62)

Maintenance Tips For Electric Industrial Trucks

FOURTEEN ways to lower operating costs of electric industrial trucks were outlined by Charles Greener, general service manager of the Automatic Transportation Company. Planned preventive maintenance assures reduced service budgets, longer truck life, and less "down" time while trucks undergo repairs, Mr. Greener said. His program for one-truck or fleet operations, based on studies of successful techniques, includes these recommendations:

1. Loads should suit the truck. Teach your operators that truck capacity varies with load length, and that continual overloading causes serious breakdowns and plays havoc with tire bills. Use trucks with ample reserve capacity.

2. Keep floors clean and in good condition. Bad surfaces cause damaging strains and shocks, and again your tires suffer unnecessarily.

3. Replace tires when they develop flat spots or when big chunks of rubber are gouged out. Stretching tire use damages the truck, costs you far more in repairs than you think you are saving, and is bad for driver health and efficiency.

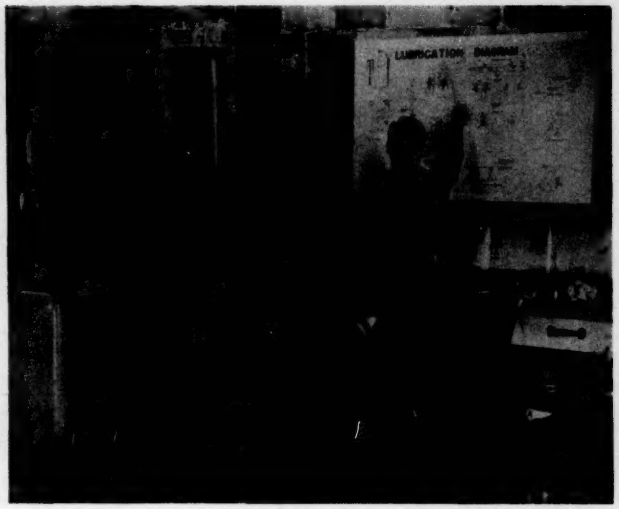
4. Let the right man—the mechanic—do repair work. When something goes wrong, have your operator call the mechanic, and don't let him have the truck pushed or towed without the mechanic's orders.

5. Your operators should be trained thoroughly in proper use of equipment assigned to them. Whenever possible each man should work permanently with the same truck.

6. When you get a new truck, be sure to obtain full information about it. Have the manufacturer's service representative demonstrate it for your operators. He should advise your maintenance force, explain spare parts needs, and make sure no damage was incurred in shipment.

7. Your mechanical maintenance program, whether large or small, should follow a regular schedule. Use a series of mechanical worksheets or tags prescribing services to be performed. Keep a fleet maintenance record to learn the life expectancy of important units of the truck. This enables you to make necessary changes in advance to avoid complete breakdown, preventing loss of operating time.

8. Trucks need a monthly lubrication and mechanical check, usually requiring about an hour and a half, which should follow removal of dirt and grit from the undercarriage. Fleet operation calls for a cleaning rack in a small room or enclosed area. A week alkaline solution applied under steam pressure does a good cleaning job, and compressed air is best for drying. After the mechanical check, lubricate the truck. Make a large blow-up of the manufacturer's lubrication chart so your maintenance men can follow it easily. During the check, put the truck through its paces thoroughly in all speeds, and with a normal load.



This maintenance man makes sure that an electric industrial truck is lubricated properly by working from an enlarged copy of the manufacturer's instruction chart. Following a planned procedure of preventive maintenance means longer life and greater operating efficiency for trucks, says Automatic Transportation Co., Chicago.

9. Semi-annual mechanical checks and lubrication are more extensive. Included are cleaning and repacking wheel bearings, changing drive axle grease or oil, and other services not assigned to short-term check-ups.

10. Electrical checks should be conducted on a weekly, monthly, and semi-annual basis. The weekly check includes tightening loose fittings and replacing worn or damaged ones. Monthly, all electrical operations should be observed closely. Tightness of electrical connections and proper insulation of wires should be noted carefully.

11. Be careful with your batteries. Overwatering will weaken the electrolyte, and when it spills over from the battery case, the electrolyte causes corrosion of other truck parts. Flushing the battery is a necessity, as the battery must be kept clean. Make this part of the weekly inspection. Use properly maintained automatic charging equipment.

12. General overhauls should be scheduled according to your operating conditions, such as the number of hours the truck works daily, plant conditions, and the driver's ability.

13. Keep a weekly log for each truck, on which you record inspections, lubrications, and cleanings. This permanent record will help you make sure necessary preventive maintenance functions are performed.

14. The program outlined above is based on one shift a day, and favorable operating conditions. Under rough conditions, such as bad floors, more than average dirt, or more than one shift a day duty, trucks require more frequent use of some or all of these checks. It is wise to consult with the manufacturer's service representative in regard to this.

Mr. Greener recommended that truck users treat preventive maintenance as a money-saving part of their operation. Properly conducted, it will permit finding out which operators are not doing their jobs well, which trucks are assigned to jobs for which they are not fitted, and what changes can be made in truck design to improve their utility.

He also noted that the present production emergency and restrictions on materials will make industrial trucks and parts harder to obtain.

Practical Refrigerating Engineer

NATIONAL ASSOCIATION PRACTICAL REFRIGERATING ENGINEERS

Leland Kenagy, Newton, Kans.

Treasurer, National Association Practical Refrigerating Engineers

NEWS

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MAINTENANCE

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APRIL—NATIONAL REFRIGERATION ★ SAFETY MONTH ★

Safety in Refrigeration Pays All-Ways Every Month in the Year

Safety in Refrigeration Plants

Plant accidents involving bursting and breaking of vessels, lines, and machines

ELMER JOHNSON
California Consumers Corporation
Los Angeles, Calif.

THE subject of accidents in the refrigeration plant, is not a very happy or cheerful one. When we recall the loss of life, personal injuries, damage to equipment and material, and interruption of business, we then become aware of the extreme seriousness of the subject. It is not the purpose of my presentation to recount and dwell on the details involved in circumstances pertaining to this subject. To do so would undoubtedly cast a spell of gloom.

Instead I should like to present a challenge to all practical refrigerating engineers. This challenge will require that you apply your skill and ingenuity in identifying and correcting the causes of so many of our plant accidents. Basically, we as craftsmen do not appreciate the sight of damaged equipment. Why then does a plant accident involving pressure vessels, piping, or compressors seem spectacular and arouse our curiosity? The answer to this lies in the fact that we attempt to determine the cause.

Causes of Piping Failure

The re-occurrence of certain types of accidents causes me to believe that our curiosity has not been directed along the proper channels. My reason for making this statement can best be explained by analyzing a few acci-

Presented to the 41st NAPRE convention.

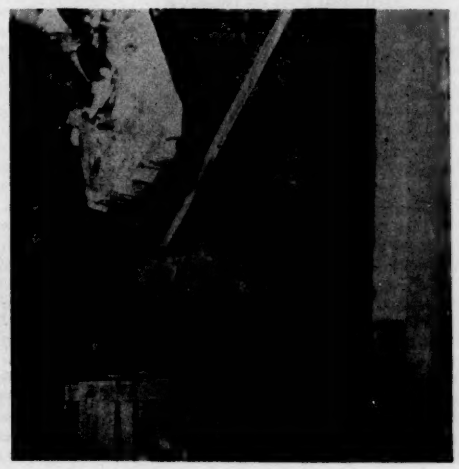

Fig. 1. This shell and coil brine cooler burst and caused much damage. Indications were that a high pressure steam line had been connected to the brine pipe to clear an obstruction in it.

dents involving accumulators and pressure vessels. There appears to be six major causes of failure of piping, vessels and compressors. They are as follows: vapor pressure, hydrostatic pressure, fluid velocity, expansion and contraction of metals, vibration, and liquid carry over to compressor.

High vapor pressure is most commonly associated with high temperatures in condenser or evaporator. Condenser water failure can be very dangerous unless precaution is taken and the plant is equipped with an alarm device, high pressure cutout switch and safety valves. Scale formation on condenser tubing is more gradual in effect except that a sudden peak load can cause an unusually high head pressure.

Cleaning and Defrosting

The cleaning or defrosting of evaporators using hot water or steam has been the cause of many accidents. In most cases the cleaning has been in dairies where sterilizing and cleaning with steam is necessary from a health code standpoint. It is seldom the plant operating engineer that does the cleaning but it is his responsibility that the equipment be pumped out and ready for cleaning.

Ice and Refrigeration, June 1950 issue, carried an account of an accident involving steam used to clear a brine tube in a shell and coil brine cooler. Can we blame this accident on vapor pressure or hydrostatic pressure? The brief article does not provide the answer but the problem is worthy of study, Fig. 1.

A later issue of Ice and Refrigeration (April 1950) gives an account of a very common accident, but the report, like most others, does not complete the story with the very important information that we all look for, namely—the real cause of the accident. See Fig. 2. Does it seem possible that an ammonia tank should burst at 60 F temperature? The vapor pressure of 60 F liquid ammonia is 93 psig. Surely this ammonia tank was built to withstand a pressure of 93 psig. The report states that there was no pressure relief valve on the tank. I grant that a relief valve would have prevented this accident but that does not provide an answer as to the cause of bursting. What are the factors contributing to the accident? It was a sub zero holding room, water defrost coil. The liquid and suction valves had been closed and water turned on. It is my theory that this accident can be attributed to hydrostatic pressure.

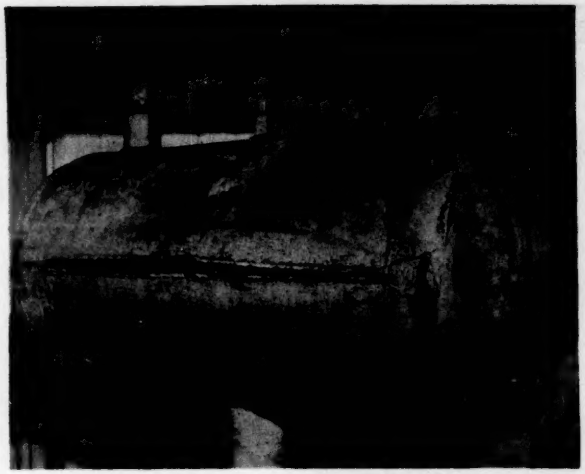

Fig. 2. This horizontal surge drum ripped open as shown during defrosting of the coils to which it was connected. The water used for defrosting was 60 F temperature.

Liquid Filled Space

Assume that the reason for defrosting the coil was that the rate of heat transfer was reduced to a minimum due to ice and frost on the heat transfer surface. Assume also that the liquid feed control was proper for load conditions but when ice and frost reduces the heat transfer rate the slight leakage that develops in the liquid feed valve is sufficient to completely fill the evaporator and accumulator. Then by closing the liquid and suction valve we have bottled up a quantity of low temperature liquid refrigerant. The volumetric expansion of the liquid will then result in extremely high pressures. As an example, a tank of one cubic foot volume would hold 42.65 lbs. of liquid ammonia at —30F.

If the temperature was increased to plus 60 F as in the case of defrosting with water the liquid would increase its volume by 11 percent. If no vapor space is available to accept this increase in liquid volume then the internal pressure builds up to a very high level. For an example refer to 1950 Operating Data Book, page 59. The effect of this pressure has caused float balls to collapse, tanks to burst and piping to split. Float balls have been caused to collapse under tests at approximately 1000 psig. This gives some idea of the pressures involved.

Liquid velocities can cause valve and piping failures under certain conditions. I would like to cite an example of an uncommon accident, —a three inch ammonia globe valve on a suction line operating on a continuous 15 psig pressure. The bottom of the valve body was completely blown out. An ammonia coil in a water cooler had sprung a leak and water was entering the suction line.

The conclusion reached as to the cause, was that the action of the water in absorbing ammonia vapor caused a drop in pressure which accelerated the flow of water. The velocity of the water striking the valve was blamed for the failure. It is apparent that liquid lines present a problem in respect to high velocity of flow. Good operating procedure is to slowly fill liquid lines that have been pumped out. The use of liquid line solenoid valves has caused line vibrations when the valves open and close.

Metal Expansion

Expansion and contraction of metals due to temperature changes presents problems mainly in piping of long, straight runs. Expansion loops or packed sleeve-type expansion joints should be used when necessary.

On one occasion an ammonia storage tank developed a crack while being filled with liquid ammonia at approximately 20 F. The tank was 36 inches in diameter and had a bolted flange-type head. The tank was at engine room temperature of 80 F when the filling operation began and low temperature ammonia flowed in. Due to the mass of metal contained

in the flange, the flange did not drop in temperature as rapidly as did the shell. The more rapid contraction of the shell resulted in a strain at the joint of flange and shell causing a crack near the weld. So often this type of failure is considered as fatigue but there usually is a logical reason for its occurrence.

Vibration of piping can be caused by the actual shaking or movement of the compressor or the pulsating effect of the vapor being compressed and forced through the discharge line.

Pressure relief valve connections present a problem. Short rigid piping should be avoided; loops, coils or bends can minimize the hazards of this type of vibration. Pulsation vibration is more difficult to eliminate. Oversize discharge piping can act as a reservoir or ballast to remove the shock waves set up by a reciprocating compressor. Available on the market is a pulsation vibration dampener with a ballast tank and restricted discharge. I believe every engineer has, at some time, observed or become aware of the results of liquid slop-over on a compressor. Compressor heads and valves are designed to handle refrigerant vapors, not liquid. High pressure relief valves offer no protection to this type of hazard. What type of protection does your plant have?

Liquid Carry-Over

Let us analyze some of the factors that cause this carry-over of liquid refrigerant to the compressor. When the suction line temperature and compressor discharge temperature start to drop followed by a pounding in the compressor, we then try to determine the cause. Yes, we reason that if liquid is carrying over to the compressor, we must have trouble with the liquid feed control to one or more of the evaporators. So we set about to check and repair these controls.

Some times that is the answer, but too often after we are convinced that the controls are functioning as they were intended, the periodic slop-over still continues. In low temperature refrigeration, especially in food freezing plant we subject the evaporator to extreme loads. The liquid refrigerant in an evaporator under no load is not agitated and the evaporator becomes filled at that condition. When the product is subjected to refrigeration, the initially high temperature difference between refrigerant and product causes a high rate of heat transfer resulting in a violent evaporation and high vapor velocity. This forces liquid from the evaporator and accumulator, thereby endangering the compressor. Accumulators of sufficient size should be installed at each evaporator used to freeze products. A suction line liquid trap should be installed near the compressor. Provision should be made to remove liquid refrigerant from this trap either by evaporation or recirculation through the evaporator.

The most common result of severe liquid slop-over is that the compressor head is blown off, sometimes landing several blocks away from the engine room. Flywheel spokes sometimes break before the head bolts are torn loose.

Summary

Do not subject refrigerant cylinders to high temperature. Do not over fill refrigerant cylinders — weigh them. Determine if receiver sight glass is empty or full. Provide relief valves and safety valves at required locations. Keep automatic controls in repair.

Remove and test safety valves periodically. Control your plant, don't let it control you.

Death Traps

OLD refrigerators stored or abandoned where small children can play around them have often proved to be death traps. When a refrigerator is discarded the latches should be broken or the doors removed. If there is some chance that the refrigerator might be used again, the latch can be removed and stored.

The same treatment should be given to refrigerators temporarily out

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of use if they are held in locations accessible to small children. It would certainly be a step forward if fatalities from this source could be prevented during the current year.

Reports to George Schuld, chairman of the Refrigeration Safety Committee record the death of 42 children trapped in refrigerators during the past 18 months. It does not include all fatalities from this source—just the ones reported to him.

N A P R E

Question Box

H. G. Venemann, Professor of Refrigeration, Purdue University and chairman of NAPRE Educational Committee, answers members operating problems monthly in this column. Send questions to Chairman H. G. Venemann c/o Purdue University, West Lafayette, Indiana.

Drop Tubes Ice Up

Question No. 877: During the winter months in our ice plant we have much trouble with balls of ice freezing on the air tubes placed in the center of our ice freezing cans to agitate the water as it freezes. This ice accumulation stops the flow of air and the ice blocks are not clear. What would you recommend to remedy this difficulty?—J. N.

ANSWER: The problem of freezing of water within the drop tubes has been answered several times in our N.A.P.R.E. publications. It was first answered on Page 49 of the October 1944 issue of ICE AND REFRIGERATION, then on Page 77 of the 1945 Operating Data Book, and a third time on Page 49 of the 1946 Operating Data Book. These answers suggested that the air from the blower be heated with steam or hot water through finned pipe installed within the main air distributing header to such a point where the freezing in the tubes is eliminated. Where steam or hot water is not available, electrical strip heaters have been used successfully. I would suggest also a gas heater if gas is available.

Even though you succeed in eliminating the freezing of the drop tubes and in maintaining a continuous flow of air into the water until the ice is almost completely frozen, you would

not obtain clear ice or avoid discoloration with certain waters unless it is properly treated.

Some plants are unable to produce clear ice in winter because the engine and ice tank rooms are not heated, and frequently the water is not treated. But drop tubes frequently freeze up in the spring or summer months under certain atmospheric conditions. In all such cases the air must be heated.—H. G. Venemann.

Condenser Tube Corrosion

Question No. 878: We have a horizontal shell-and-tube condenser cooled with well water at 57 F which is not recirculated. We find that about 5 years is the life of the tubes which corrode at the welded ends. The condenser connections are arranged so that the water drains out of the condenser when its supply pump is stopped. Do you believe there would be any benefit in changing the connections so that the condenser is full of water at all times?—R.W.C.

ANSWER: Corrosion costs industry many millions of dollars each year in this country alone. Much money has been spent in trying to prevent it, and in many cases with gratifying results. However, I do not know of any paints or surface treatments that will do much good in condensers using well water. I believe that you might help your situation some by keeping the condenser full of water during the shut down period instead of permitting it to drain off thus keeping most of the air away from the tubes. Damp air is an oxidizing agent which accelerates corrosion. Of course the mineral content of the water also has much to do with corrosion. The reason for draining condensers is to avoid freezing of the water; this is especially true with closed type shell and tube condensers. I will have more to say on possible aids in my answer to Question No. 879.—H.G.V.

Tube Coatings, Other Remedies

Question No. 879: In the case of corrosion around the welded ends of the condenser tubes do you think some type of coating as mentioned in discussion of Question 861 would be effective? We have only the one condenser shell and it is in use all the time. Thus there is a problem of drying the tubes quickly before the coating is applied. Have you any suggestions on this?—R.W.C.

ANSWER: You mention corrosion of the tubes at the welded ends. Perhaps you are using the wrong welding rod and could improve the life of the tube ends by using a rod of stainless steel or of other high corrosion resistant metal. Or it might be advisable to protect the ends by spraying hot solder or aluminum on them. Why not have some welding expert try it out on a couple of tubes?

As to the effectiveness of Compound L, I would not venture a prediction. Many such compounds have been tried with varying degrees of success. In your case it certainly would do no harm to try it out, especially since the deterioration of your tubes occurs at the ends where it is relatively easy to apply a coating. No doubt the manufacturer of this compound would instruct you to clean and dry the surface thoroughly before applying it. The drying operation may be speeded up by warming the air in the room and after removing the heads use electric fans to blow air through the tubes.

The metal coating if practical in your case would be more expensive than the petroleum product, but it would undoubtedly last much longer. It is worth investigating.—H.G.V.

New Questions

Ice Water Treatment

Question No. 880: Our plant is not heated in winter and our water treatment equipment is not effective under these conditions. It is a lime-alum water treating system. What is the function of sodium aluminate in ice water treatment? Would sodium aluminate give better results under the conditions described?—J. N.

Bleeder Condenser Corrosion

Question No. 881: The condensers in our plant are bleeder type, atmospheric design in which the hot discharge gas from the compressor goes through the bottom pipe which acts as a desuperheater. Then the gas passes on up to the top pipe in the stand. The temperature of our condensing water is 93-96 F and when it reaches the bottom pipe in the condenser stand it is relatively warm. The bottom pipe in all the condenser stands rusts out very quickly and we blame this on the high temperature.

We have tried to relieve this condition of rapid rusting by coating the bottom pipe with bituminous coating but it is not satisfactory. Have you any remedy to suggest for this problem?—S. N. S.

Volume and Relief Valve

Question No. 882: The formula given in Question No. 871 (February, page 46) for sizing a safety relief valve bases the capacity required on the diameter and length of the vessel to which it is attached. A receiver or surge drum would hold several times as much refrigerant as a shell-and-tube condenser of the same diameter and length because the water tubes take up so much volume. In this instance, it appears that the relief valve for the receiver should be much larger than for the condenser.

Would it not seem more logical and accurate to base relief valve capacity on the volume of refrigerant contained in the vessel being protected? —J. L. W.

News Notes and Chapter Activities

Dallas

BY FRANK CUNNINGHAM

AT THE first meeting of the month Elliott Hallowell gave a very interesting and informative talk on ammonia, its characteristics and the types of controls most commonly used with this refrigerant. Many different types of controls are in use today. Plants which are almost completely controlled automatically are becoming more common. Safety relief valves also were explained. By the way, the graph presented by Mr. H. G. Venemann on page 46 of this February's issue of ICE AND REFRIGERATION is of great value to anyone particularly interested in the required sizes of pressure relief valves and the allowable length of discharge pipe.

A very interesting and encouraging talk was presented by Fred F. Alford on the many advantages of N. A. P. R. E., its regular meeting attendance and chapter interest. We greatly appreciate the privilege of having our chapter meetings in the nice auditorium of Mr. Alford's refrigerated warehouse.

Hats off to our new President, W. E. Weaver, for one of the best presentations of an interesting and educational lecture we have had in a long time, and which was the general feeling of the members when the next meeting was over. He brought with him and explained the use and working principles of, (1) A new type thermostatic expansion valve which was so constructed as to act as an automatic expansion valve until the evaporator pressure was lowered

to a predetermined level whence from that point it functions as a regular thermostatic expansion valve. (2) A valve that, when installed in the equalizing line of an expansion valve, would eliminate the need of a very expensive solenoid valve in the liquid line controlling the thermostatic expansion valve causing it to act as a shut off valve when desired. It is an electrically controlled valve and can be wired in to operate automatically. (3) A control which is specially designed to shut down high speed Freon-12 machines in case the oil pressure fell below a predetermined level.

All these valves and controls are specially designed for Freon-12 refrigerant, as was a new type automatic defroster control that could be set to defrost an evaporator from one to eight times in 24 hours. The special feature of this control was that it was really a combination time and pressure control, the timer breaking the circuit closing the solenoid valve or valves. The pressure then had to build up sufficiently high to completely rid the coils of the ice before it would from the pressure side, close the circuit and put the evaporator back in normal operation.

We also had a discussion on small F-12 air cooled units of ½ hp and larger which were remote type installations, especially where the unit was located outside the building, without having much housing around it. A job like this is installed in the summer. Due to the normally mild winter weather we have here in Texas, it is often overlooked what might happen in case of severely cold weather, which we do sometimes have. If low side controls are used it is easy to see that when the outside temperature falls a few degrees below the desired temperature of the vault the pressures all fall below that of the desired cut in pressure, resulting in the unit failing to start and consequently a warm vault.

A temperature control could and usually is used but this is not very desirable because with these conditions, often the head pressure is far too low to furnish enough liquid for the evaporator to function properly, causing very inefficient operation of the equipment. One member told of his experience in a case like this one winter when he was operating a refrigeration service business of his own. His work was a little slack one morning so he was very interested in an article on the principals of the 'heat pump,' when the call came in that one of his grocery store customers had a hot walk-in cooler. After checking the job to make sure the cold weather-low side control combination was the cause of the trouble, he was still mulling over in his mind about this heat pump idea, when this thought dawned upon him, "Bury the receiver tank!".

St. Louis

By K. M. Holaday

PRINCIPLES of modern air-operated control instruments were explained to members of St. Louis Chapter at the regular meeting February 19 by Donald Spalding of The Taylor Instrument Company. Speaking before a group of about 50 in the Palm Room of the Kingsway Hotel, Mr. Spalding began with the simplest arrangement of mechanically actuated device for regulating a pilot valve in connection with a primary valve on steam, refrigerant, or other process fluid, and showed how the controller can maintain accurate regulation of a wide variety of processes in many industries.

By means of diagrams and demonstration units the operation of the basic controller was made clear. Mr. Spalding explained the undesirability of a very high degree of sensitivity in most cases, and he showed how certain refinements such as the "reset" and "pre-act" elements can be added to the basic instrument to modify its responses and prevent "hunting" under various process conditions. The discussion stimulated many questions on maintenance of instruments, quantity and quality of air supply, and replacement of operating elements.

During the general question-box period, this problem was discussed: "I am in charge of a large Freon 12 air-conditioning plant. It is a chilled water system and does not have an oil separator. Oil disappears from the compressor crank case periodically. How can this be avoided?" Cliff Renner right away asked whether the cooler is horizontal or vertical, is the refrigerant outside or inside the tubes. The member who submitted the question at a previous meeting was not present, but Charlie Wunderlich and Les Fleiter suggested that the cooler is probably a horizontal shell with water inside the tubes and refrigerant outside.

Ray Cambron said a separator would help solve the problem by keeping most of the oil out of the low side. Lester Lanser said the oil level in the crank case should not be carried too high, as this tends to pump slugs of oil over into the condenser. Charlie Good suggested that maybe the Freon charge is too low, thereby causing the cooler to operate with the liquid level low. Under such conditions the refrigerant probably does not boil violently enough to break up the layer of oil accumulated on the surface of the Freon. If the liquid level is kept up near the vapor outlet, droplets of oil will be carried back continuously to the compressor. It was generally agreed that the answer to this question would be (1) install an oil separator, and (2) add enough Freon to carry the liquid level high in the cooler.

As usual, several members were on hand for dinner together in the King Cole Room before the meeting. Any who can turn out by 6:30 or 6:45 are invited to enjoy the sociability of the occasion.

Chairman Fleiter announced preliminary arrangements for the 2nd annual Midwest Regional NAPRE Conference to be held March 31 at the Kingsway Hotel. He stated that printed programs are to be mailed out early in March to members and interested friends.

In late January, Lester Lively passed away. A member of the chapter for several years he was refrigerating and air conditioning engineer of the Socony Vacuum Building in St. Louis.

Secretary Wunderlich reported that all but a few members have paid up current dues. He stated that a final notice is to be mailed soon to those who have not paid, reminding them that Ice & Refrigeration subscriptions will have to be discontinued for all members not paid by the end of March.

The members of the chapter learned with regret about the death of Robert Schuchart which occurred in mid-February. He had been a member of the association for 22 years and had attended a number of national conventions. He operated the Pacific Refrigerating Co. at Pacific, Mo., near St. Louis. The funeral was held in the Pacific Baptist church on February 18.

Seattle

By Joseph Lester

SEATTLE Chapter held a special joint meeting with Tacoma Chapter for an educational tour of the Sick's Seattle Brewing Co. The members had as their special guests their wives or friends and we met at 8:00 p.m. in the social room of Sick's Brewery.

After introductions of all present we proceeded in groups of 10 or 12 to tour the brewery. To see the brew started from the beginning to the end and all the machinery and equipment required to do this, is far too detailed to describe here. But this chapter recommends to those who have not seen this to do so, for you will never forget it.

Upon completion of these tours we rejoined in the social room for a very enjoyable evening which included refreshments served by the management of the brewery.

San Francisco

By Leroy Etzel

The first session of the new refrigeration course was attended by 32 men. This course by Professor John Thompson, San Francisco City College, is giving the men what they want and they are extremely interested in it. The sessions begin promptly at 7:30 and last 50 minutes. They are the first order of business at the meetings and no other chapter activity is allowed to interfere with them.

The course is based on the textbook "Refrigeration Theory and Applications" by H. G. Venemann. Later on material from other texts will be utilized. All of us are well pleased by the response to this course and the excellent way in which it is being presented.

New Orleans

By Leo Vivien

WE HAD a fine turn-out for the plant visit to the establishment of Industrial Electric Inc. Personnel of the company conducted us through the plant to show and explain the many varied operations carried on.

In the Motor and Generator Repair Department, which was kept in operation for this visit, AC and DC motors, a slip-ring motor, a switchboard and a transformer were seen in various stages of repair. Taping coils on a taping machine and metallizing a shaft were very interesting to most members. To those not familiar with modern electric shops the amount of equipment required was surprising. Some devices seen were two overhead cranes, two tapping machines, several winding machines of different types, three medium and one large lathe, a milling machine, metallizing and welding equipment, cleaning and dipping equipment, a large baking oven, dynamic balancing machines, etc.

New Orleans chapter members visit plant of Industrial Electric, Inc.

In the sign manufacturing division bending and welding and testing the luminous tubes were demonstrated and a "running boarder" sign was on display. It was shown that the entire operation from the original layout of the sign to final erection and maintenance was done in this New Orleans plant.

In the Enameling Division, the national coverage of this New Orleans plant was in evidence as panels for gasoline filling stations, destined for nearly every state in the Union, came off the production line to be porcelain enameled in its continuous oven.

The visit ended with a buffet supper of turkey, ham, cold meats, fish, cheese, boiled shrimp, etc., and plenty of cold drinks.

At the following meeting, Educational Chairman Frank Chase announced that Bartholomew Mancuso, Supervising Engineer of the Pelican Ice and Cold Storage Co. would start a series of lectures on Installation, Operation and Maintenance of Refrigeration plants. The lecturer will discuss the subject, then will have general discussion from the floor. Questions presented will be answered at the following meeting.

Mr. Mancuso's subject at this meeting was Laying the Foundation for the Education of the Practical Engineers and for his plant. He stressed the importance of the engineer obtaining some knowledge of physics, algebra, math and thermodynamics and told of some good books available on these subjects which the members should use for home study. The subject discussed was "Laying Foundations." The soil condition, weight of foundation mixing of concrete and arrangement of forms were explained. Interest in the program was manifest by the lively discussion after the lecture by the membership.

Some of the questions asked were how to calculate the weight of foundation material—cause of deterioration of cement around sulphur mines and sugar mills and causes of foundation bolts shearing off.

Mr. Mancuso literally started with Laying of Foundations and intends to bring the series of lectures step by step to the safe and efficient operation of the refrigerating plants.

Detroit

By L. L. Adams

THE March meeting was held in the guest house of the Altes Brewing Co., where the attendants enjoyed a very good buffet supper preceding the meeting. Then C. B. Smith of the W. C. DuComb Co., presented the sound motion picture "Rhapsody in Speed" produced by the U. S. Electric Motors Co. It showed the manufacture of electric motors and varidrives. All of the manufacturing operations were shown and described and the movie proved to be very interesting.

The evening was completed by a guided tour through the brewery where all of us had an opportunity to see the equipment and study the processes.

We are looking forward to a special event in April when Bob Doremus will present a very comprehensive talk on low temperature refrigeration. He has had broad experience in this field and the subject will include discussion of the very low temperatures which have been reached in recent months.

Colton

By H. O. Bonter

WE HAD a very interesting and instructive meeting with L. C. Clarke, electrical engineer, Colton Portland Cement Co., discussing "High Lines." He explained the construction of power lines and how to identify the different line voltages by the number of insulators supporting each power line. The higher the voltage goes the larger the number of insulators used. In connection with his talk Mr. Clarke included the safety angle and told how the electricians handle high voltages safely. He pointed out that a wire is like a gun. It should always be considered loaded until the person knows absolutely that the power has been cut off. After Mr. Clarke's talk the chapter enjoyed the usual luncheon and prize awards.

The chapter held its annual dinner at the next meeting and it was attended by a number of members and their friends. They had plenty to eat and enjoyed it fully. We are indebted to the wives who cooked so many fine dishes at home and furnished them to us. The dinner was served at the Santa Fe Ice Plant lunch room by the dinner committee.

The special guest at this meeting was Hayes T. Cory, chief engineer of Baker Engineering Corp. of Los Angeles and a member of the chapter there. His subject was "Trends in Compressor Design" in which he traced the significant developments from the early days of refrigeration. The early ammonia compressors were large, bulky machines which required a lot of space and it is difficult to realize how equal capacity is produced today in machines of so much smaller size. Mr. Cory went on to discuss the trends which compressor design will probably follow in the future because the manufacturers are continually working to improve operation and reduce costs.

Secretary Bonter had unusual luck in receiving both of the prize awards.

Memphis

By Charles Conley

ON FEBRUARY 21, D. Canale & Co., distributors of Budweiser beers in Memphis showed a sound motion picture "The House that Faith Built" produced by Anheuser-Busch, Inc. This is one of the best industrial movies we have ever seen. It recounted the story of the life of Adolphus Busch, how he started in the brewery business and the great foresight and energy with which he met various hardships and problems such as depressions and prohibition.

The picture took the audience through all the brewery operations and gave complete data on the number of bottles cans and kegs of beer made each hour, day, week and year. It showed the results of the depression days and the period under prohibition in which the company diversified its operations by producing other products. This was a special event meeting in which the program fitted very well and everyone enjoyed the refreshments which were served at the conclusion.

The special subject at the March

7 meeting was heat exchangers. R. E. Larkin, engineer for T. G. O'Brien Engineering Co., discussed the engineering and application of this important plant equipment. He used the blackboard to give examples of heat exchanger calculations and showed how to arrive at the proper size for various requirements in changing the temperature of water, milk, oils and other fluids. Then he proceeded into a discussion of condenser sizing and application to fulfill various load demands and meet the requirements at different water temperatures.

Chicago

By E. B. Jones

A LARGE group of Chicago Chapter members and guests inspected the ice cream plant of the Borden Company. This is a relatively new plant erected on the southwest side of Chicago. The visitors were greeted by Chief Engineer James Rankan who led the tour and explained the numerous features of interest.

The well arranged engine room which glistened with new paint took the eye of everyone. A row of vertical booster compressors was along one side of the room. Across the aisle were the second stage machines. All of them were well guarded and had good work space around them. The small amount of liquid which returns from the low temperature equipment is caught in a large trap which is provided with a two stage pump to return the liquid to the high pressure receiver. Suction gas returning from intermediate temperature equipment and the discharge gas from the boosters enters a vertical inter-cooler near the bottom so that the gas is desuperheated by circulating up through the liquid level maintained in the shell.

Two large horizontal shell and tube condensers handle the total refrigeration load which runs about 300 tons. The condensers drain into two receivers of about the same diameter as the condensers. The plant has turned out some 500,000 gallons of ice cream in a single month. This requires a lot of ammonia circulation.

The plant piping is especially noteworthy. It is all welded and generous use is made of bends. This reduced the number of fittings and flanges and simplified the pipe insulating job. The finish on the bare pipe and the insulated lines was excellent and the details of design followed the best practice.

About 60 trucks are refrigerated by direct expansion through hold over plates with a simple but effective system. Refrigeration is supplied by low pressure, pump actuated, ammonia recirculating system. Automatic control on the liquid accumulator maintains a proper liquid head on the pump while a small orifice in each truck system keeps the amount of liquid circulating through the refrigerating space at a practical figure. The safety features on the trucks were interesting. Even though the truck door is locked on the outside a man caught inside can push the latch and open it with a bar fixed in place for this purpose.

The equipment for processing ice cream mix and the freezing equipment were inspected along with the hardening room. The latter is refrigerated with shelf coils and carried at about 25 to 28 deg. below zero. When the group reassembled they were served with ice cream and a question period followed.

The engineering features of the plant were described by Gilbert Marks and Eugene Rytlewski of Westerlin and Campbell Co., who installed the refrigerating equipment. As Mr. Marks pointed out, this is one of the few ice cream plants that is not the result of expansion from a smaller size, but was laid out and equipped as a unit. He discussed a number of the features and said that the refrigeration operating cost has proved to be at a record low.

Mr. Rytlewski called special attention to the excellent piping layout and design. This contributes to good operation and low overall cost, he said, and went on to answer questions about other features of the plant.

Among the out of town visitors was J. R. Mitchell of Ft. Wayne, Ind., who operates a warehouse company and is planning the erection of a freezer storage. He declared that the inspection trip and the discussion had given him the best information in a long time and he would not have missed it for a lot of money.

The early part of the meeting featured a sound color movie which depicted life in Alaska in interesting detail. The feature of the meeting was arranged by Don Parkhurst of Burge Ice Machine Co., who presented T. H. Rea, Sales Manager of Armstrong Machine Works, Three Rivers, Michigan who discussed purging of non-condensable gases from refrigerating systems and the connection and operation of automatic purging equipment.

As a homely illustration of the effects of non-condensable gas, Mr. Rea called attention to steam radiators. These must be equipped with traps to release the air. If the air is not pushed out, the steam cannot reach the condensing surface and thus is unable to give up its heat to the room. The same action takes place in the condenser where air or other non-condensables retard the contact of the refrigerant with the condensing surface and the results are similar to a shortage of condenser surface with consequent increase in the condensing pressure. This in turn brings an increase in power consumption, overloads the motor, and produces a higher discharge temperature.

Descriptive literature on the Armstrong Purger was distributed and Mr. Rea described its operation. He said its fundamental parts are similar to those used in the Armstrong steam traps. The purger contains a coil of pipe through which liquid refrigerant is expanded and the contents of the purger is brought down to evaporator temperature. This condenses the refrigerant gas that enters the purger chamber and allows the non-condensables to collect at the top where they are released through a float valve.

Mr. Rea emphasized proper installation of purgers so that they will give the desired results. Then he went on to relate interesting applications. Frequently he said, complaints are received from small plants operating at pressures above atmospheric, where it is stated that the purger no longer does the work intended. Usually a check up divulges the fact that the non-condensables have been cleared from the system and the purger will not operate again until more non-condensables collect in it. A rule of thumb, he said is that the power consumption is reduced 2 percent and capacity is increased 1 percent with each reduction of 4 pounds in condensing pressure. Mr. Rea passed out reference curves prepared for the company by Robert C. Doremus of Detroit Chapter to show power savings under various conditions and reductions in condensing pressure. The interest in the program was demonstrated by the numerous questions presented by the audience in the discussion period.

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Stockton-Modesto

By R. M. Edger

THE subject of new developments in industrial control was presented to the February 19 meeting by Charles B. Luce, General Electric Co., whose subject particularly pertained to their new line of magnetic switches and synchronous motor controls. Mr. Luce brought out several thoughts on preparedness to which most managers have been giving a lot of consideration. He stressed the importance of being able to handle a heavier wartime load than in former years. In connection with this he recommended that everyone make sure his electric controllers are heavy enough and in good condition to withstand the additional work which will soon be expected of them.

Accompanying Mr. Luce was E. C. Nelson, local manager of the General Electric Co., who invited the chapter to visit the G-E train when it arrives in Stockton later next month.

After the lecture the 1951 officers were installed by Mr. Hedburg.

At our meeting of March 5 we decided to purchase a 48 cup coffee maker. This is a pretty good deal for any chapter that might be interested. By selling 65 bottles of shampoo at their regular price we are obtaining this fully automatic electric coffee maker. We feel this is a very valuable addition to our chapter equipment and will be glad to give the details about securing it to any chapter. Address the writer at 1905 E. Bishop, Stockton, Calif.

The special speaker at our meeting was R. A. Johnson, By-Products Division, Pacific Lumber Co., who gave us a lecture on Palco Wool insulation. This is shredded redwood bark. It has a k factor of 0.255. This product is flame proof, will not burn and is very good insulation that is light in weight and very easily ap-

plied. It comes in bales and is run through a machine that fluffs it up making it easy to install. Another good thing about this insulation is it does not shake down and leave parts of the walls uninsulated. The more you shake this product the fluffier it gets and the better insulation you get.

After his lecture Mr. Johnson started his moving picture of the Redwood trees to the finished lumber and home construction. This was one of the most beautiful pictures the chapter has ever seen and we are all very grateful to the Pacific Lumber Co. and Mr. Johnson for bringing us such an enjoyable evening. It was a very timely subject because many of us had read the article in the Saturday Evening Post of February 24 on the Pacific Lumber Co. and the town of Scotia, Calif.

Los Angeles

By Fred Herr

FREEZER Room Construction Problems," a Kodachrome illustrated talk by Ed L. Nelson of the Union Ice Company's engineering staff, was the top attraction of the educational program of the March 7 meeting of Los Angeles Chapter in the Terminal Club.

The talk was a re-release of one of the outstanding papers delivered at the national convention in Hollywood last fall. It covered floor, wall, roof and door construction. A black board, with spot light centered upon it, was set up adjacent to the screen to enable the speaker to amplify and supplement the screened illustrations with blackboard diagrams and formulae. The members and guests attending this session, included a quartet of members who drove 70 miles from Ventura, Calif., to hear Nelson's discussion on how freezer rooms should be built.

Three new members were accepted at this meeting, which brought the total signed between January 1 and March 7 to 15. A statistically minded character promptly figured out that 15 new members in 5½ weeks is equivalent to 82 in a 52 week membership drive—if the early pace is maintained. It was soon evident, however, that 82 new members would not satisfy W. R. Burnett, the chairman of the membership committee, who announced that the objective this year is for each member to bring in a new member. This ambitious program, if accomplished, would result in far more than 82 additions to the chapter's rolls. Burnett issued a warning that other chapters are getting mighty weary of seeing Los Angeles walk off with the membership trophy each year. He predicted stiffer competition this year and said he looked for San Francisco Chapter to make itself heard from in a definite way during the 1951 drive.

Chairman Ed Nelson of the entertainment committee reported that a proposal had been advanced for the chapter to stage a golf tournament this summer. The suggestion elicited enough initial enthusiasm to warrant the assignment of Frank Eccleston to the task of investigating how such a tournament should be staged and how much it would cost. He was requested to present a report in four weeks.

Another proposal involved the staging of unannounced entertainment programs at several meetings each year. The theory is, Chairman Nelson of the entertainment committee stated, that quite a few members might appear at meetings more often for fear they might miss a good entertainment program.

The Izaak Waltons of the chapter will have opportunity to indulge in their liking for deep-sea fishing on no less than five occasions this summer and fall. Frank Hooper reported that the "Skipalong" (the fishing boat used last summer) has been reserved for June 17, July 21, August 18, September 15 and October 14. Those wishing to participate were asked to make advance reservations through Mr. Hooper.

Coming Events dates were announced as follows. Old Timers Night —June 20. Annual Jamboree—November 7, providing prevailing conditions at that time make it expedient to proceed with the plans.

The February 21 meeting was attended by 40 members and guests who heard Professor E. R. Mertz of the University of Southern California deliver an illustrated talk on modern methods of alloying and heat treating metals. Prof. Mertz had both an academic and practical grasp of the subject. He is at present associate professor of mechanical engineering at the university, and previously had served as chief metallurgist for the U. S. Spring & Bumper Co. Los Angeles, and Bendix Aviation Corp., Burbank, Calif.

Modern miracles being performed with metals were described by the speaker in such entertaining manner that it was 10 p. m. before any one knew it, and there was Ed Nelson rapping with his gavel to advise that it was time to adjourn.

President George Paulick presided over the brief business session. An invitation of the Electrical Maintenance Engineers Association for the NAPRE to accept a guest booth at the 5th Annual Industrial Electrical Show at Shrine Auditorium, Los Angeles, March 15 to 17, was approved. Chairman Paulick appointed first vice-president Edgar M. Marrs as chairman of a committee to arrange for a suitable chapter exhibit.

Fresno

By M. Pedersen

Our Educational Chairman, Thomas Hagar, has continued with the lectures based on the textbook, Principles of Refrigeration. At our last meeting he led in a discussion of the compresison system as covered in Chapter 4.

Henry Allen was injured during construction work on a car icing dock. He was taken to the hospital and we hope his injuries will not be severe.

Rio Grande Valley

By Armin Doneis

IN THE absence of Instructor John Muller, A. M. Casberg took up the discussion of water treatment for ice making, covering the use of lime-alum, and some of the complications involved in the use of sedimentation tanks when raw canal water needs treatment.

At Mr. Casberg's invitation Russell Sawyer initiated the group into some of the mysteries and wonders of demineralizing equipment, explaining the purpose of the Cation and Anion tanks with their related acid and alkali regenerating tanks and Zeolite softener. The use of the Solubridge as a means of determining when the demineralizer needs regenerating was described also. Mr. Casberg then continued with a rerfesher on the meaning of the term pH and described the use of a color comparator in connection with standard phenolphthalein testing solution; he added that the same test can also be performed with methyl orange.

The member who in the previous meeting had brought up the problem in which two similar ice tanks operating under identical conditions had ceased to produce equal amounts of ice at equal brine temperatures made a report on more recent findings. His report indicated that there definitely was a film of ice enveloping the evaporator coils, for addition of salt to brine brought the brine temperature down within reasonable range of the other tank, the suction pressure rose, the production on the tank in question took a noticeable step upward.

The problem of reinsulating the sides of an ice tank came up, and one member inquired about the feasibility of using loose granular mineral in place of granulated cork for the job. Other members indicated that their experience in such attempts had been unhappy ones due to the fact that it shrank in volume even though originally firmly packed and tamped into place. They also discussed its use in concrete mix for this insulating job. Such a mix is very porous and the resulting pulpy mass could absorb considerable water and then freeze into a condition that had neither mechanical strength nor insulating quality. In vault walls and ceilings they said it appeared practical to use this material where dryness could be maintained by moisture barriers.

The gathering was happy to welcome Instructor John Muller back after a long absence and his presence added much to the discussion of Accident Prevention During Maintenance and Operation. Safety precautions were discussed relative to clean floors, properly grounded equipment, safe handling of acids, the proper use of gloves of different kinds for use in handling acids and electricity respectively, safety in use of ladders, the need to keep gas masks and fire extinguishers within easy reach near an outside door. The necessary precautions for dealing with a compressor that has liquid ammonia in its cylinders or crankcase were also discussed at some length. All present felt that useful information had been

shared and John Muller's presence among us gave promise of better meetings ahead.

Yakima

By Elmer Toop

The officers elected to serve the chapter during the year are:
President, Seth Drake
Vice President Guy Stoutenburg
Recording Secretary, Virgil Harrison
Secretary-Treasurer, Elmer Toop.
Guard. Ray Strait
Educational Director, George Tilbury
The subject of our educational course is automatic controls. A lot of interest has been shown in this subject and we expect it will be most helpful and interesting to all of us.

Fish Facts?

A COMPLAINT was printed in the March report from Los Angeles Chapter that the fish caught by Frank Hooper was twice the size given in the illustrated fish story published in December. The editors of this publication take no responsibility for the accuracy of fish stories. That is an universal editorial rule.

Information sent from Los Angeles gave the weight of the Hooper fish as 11 pounds. It has been suggested by some skeptical people that most fishermen's scales run 7 ounces to the pound and they use shrunken foot rules that will not stick out of a vest pocket. Trusting people like us do not share this lack of confidence in fishermen.

A fishing expert up the coast where salmon are caught, did not question the size of the fish taken by the Los Angeles crew but he did point out that the area is noted for the fine sardines caught there. Frank Hooper's pole, he indicated, is bent double in the controversial photo and he wanted to know whether the hook might be caught in the keel of the boat.

With a purely altruistic desire to avoid all future controversy, we have labored to set up the following rules.

1—Future fish stories in these column must be supported by material evidence.

2—Our P.O. certified scale is generously offered to prove any catch.

3—All the fishermen need to do is have the fish frozen and ship it to us in dry ice, prepaid of course.

4—We will weigh the fish and announce the result in the next issue.

This procedure should obviate all future controversy and assuage any disappointments of the past.

N.B. Our scale has a 50 lb. capacity. Please send no fish heavier than this.

No Delay in Membership Contest

THIS first official announcement on the 1951 Membership Contest does not mark the beginning of the current race. News from all around the country shows that quiet work has been going on for some time. All these efforts will count in the final results tabulated this fall.

Never before have these contests featured such noteworthy and attractive trophies as the current prizes are. A bit more work is required to win them but the members who saw them at the Los Angeles convention were greatly impressed. The president of one chapter took a long look and then said "We will take that trophy home with us next year." He happened to be looking at the prize won last year by Stockton-Modesto. That was fair warning.

There are two trophies. The other one is now held, temporarily some people declare, by that shy but industrious group residing in the basin of the Los Angeles river. They are not resting on their oars but have continued to move along in the quiet way Ray Burnett demonstrated at the convention.

Opponents are Active

Neither are some of their opponents resting. Several of their traditional rivals are busily laying plans and stacking ammuntion for a real battle. They report that they believe in a shorter, more intensive drive. It will be noted, however, that they are doing the preliminary work earlier than usual and despite the method of approach their results are already apparent.

Another element has also been added. The record book shows that a dark horse is coming up to challenge the field. They could pull a real surprise on their rivals who have to carry on their work in the eye-smarting haze of the smog. At any rate they are only one less than even at the present time. In the clear atmosphere of their community they may see an opportunity to break a record.

There are two trophies, and no chapter has ever won both of them. One is awarded on total points and has always gone to a large chapter. The other goes on a percentage basis. While several chapters of large size have come close (second place), none has ever won this second trophy. The intentions of this newer group have not been declared but if they keep up their present work they can end up with the first double win yet recorded.

The same basic rules apply this year. Early in the season it is especially worthwhile to keep in mind the bonus that is added for renewals. A high percentage of renewals makes the new member additions count practically double. It is well to lay this good base early in the season because it adds greatly to the later results.

Natural Ice Harvesting Goes Modern in Montreal

ICE dealers report that more than half of the families in Montreal Island still rely on ice refrigerators to keep their perishable food fresh in the summer.

Antonio Laurin, of Cartierville, suburb of Montreal, who has been cutting ice of the suburb rivers around Montreal for a quarter of a century, says the season for ice-cutting is getting later every year. "I can remember the times when we would have our ice houses well filled before the Christmas holidays," says Laurin. "Now we are still cutting and stocking up late in February and early March."

The job, however, doesn't take as long as it once did because the cutters now use modern equipment. Formerly all the ice had to be cut by hand saws. Now a power saw does as much work in a few minutes as a man could do in an hour.

"The weather may have changed but it's still a cold job," says Laurin. "We often work all day on the river in 15 and 20 below zero weather. It takes a crew of eight to ten men to cut ice, Laurin says. Two men operate the power saw, another couple load it on the truck and two more stock it in the ice house. They can keep a four-man crew of drivers busy if the storage house is not too far away from the ice-cutting operations. The ice is cut from the river in blocks that weigh about 900 pounds but the ice dealer must expect between 20 and 30 per cent loss on this volume by the time he gets around to taking it out again for distribution during the summer.

All ice-cuttting in the Montreal area or outside Montreal for that matter if the ice is to be sold within the city limits—is under the supervision of the city Health Department. Several times a week, an inspector visits the operations. A crew of eight to ten men will cut about 800 blocks during a day, but costs of labor, gasoline and other materials have increased.

THE ICE INDUSTRY

NATIONAL ASSOCIATION OF ICE INDUSTRIES

Executive Offices
1706 L St. N. W., Washington 6, D. C.

Executive Secretary
Guy W. Jacobs, Washington, D. C.

President
H. O. McLain, Chicago, Ill.

First Vice-president
E. F. Condon, Los Angeles, Calif.

Second Vice-president
Wm. J. Ayers, Memphis, Tenn.

Treasurer
Geo. Steers, Jr., Kalamazoo, Mich.

THIS MONTH IN BRIEF

Improved handling methods in the icing of sweet corn, in the field and in the stores, has been the subject of a complete study made at Ohio State University. The results show benefits for the grower, for the merchant, and for the ice man.

Demonstration for retail meat dealers in the St. Louis area showed that dressed chickens keep better, look better, and sell better when displayed on crushed ice. Here's another way for ice men to supply a public need and thereby increase their ice sales.

A uniformed ice service man and a 60 lb. block of crystal-clear ice were featured on a recent television program sponsored by the Gulf Oil Company.

The Christmas and New Years holiday season offers the ice industry an unusual opportunity to obtain good publicity. Among the companies making use of this opportunity were one in Indiana and one in Oklahoma City, Okla.

Public relations, ice merchandising in its various aspects, reports from the National Association and local problems were subjects of discussion at annual conventions of state and sectional ice associations during February and March.

CORN ICING IS HERE

Icing sweet corn in the field and in the store retains field freshness and opens up big market for the sale of ice

J. L. GLASS
Middletown Ice & Coal Co., Middletown, Ohio

OVER the years, truck farmers and grocers have never felt that products grown for local markets required special attention. They have relied on prompt movement of the perishable from farm to store, and from store to consumer, to alleviate spoilage and loss of quality. They have assumed that precautions which have become accepted practices in the preparation and shipment of fresh vegetables across the country had no place in their operations. Hydrocooling, package icing and proper refrigeration of delivery vehicles have seldom been considered. Ice—well, that was thought to be essential only when produce had to be protected for several days.

The experimental work on sweet corn is ahead of the research on most of the other commodities in this field. This product logically came first because of its very perishable nature; its widespread availability; its universal acceptance; the customer's desire for sweet, fresh, tender corn when it is in season; and the very fact that much of the summer sweet corn offered in retail stores, although grown on farms near the city, is neither fresh, tender nor sweet.

Information developed on corn in connection with its shipment to distant markets furnished the background material. It was not, however, until the ice industry began its research in this field that we understood the real significance and possible place of ice in the local handling of this commodity.

Deterioration After Harvest

It has been generally recognized that if field freshness and the desired edible qualities of corn are to be protected for the consumer, temperatures as low as 40 to 50 F. must be maintained. At higher levels, sugar content disappears rapidly. This loss of sugar is caused by two reactions in the ear of corn. First, there is the conversion of sugar to starch. Also, respiration or breathing process results in heat and takes its toll of quality.

Purdue reports that for every 18 F. the temperature is increased, the rate

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Presented at annual convention of National Association of Ice Industries

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For the past few years the Research Department of the National Association of Ice Industries has cooperated with the unit associations and with the country's leading colleges in perfecting the use of ice in handling vegetables in retail stores. The Ohio Association recognized the potentiality of this market for ice, and gave its full support to the program, cooperating in the sponsorship of two of the early studies at Ohio State University. Those Ohio icemen who have followed up on this activity and aggressively solicited the vegetable ice business have benefited.

Following the retail icing work, the Research Department began exploring another phase of vegetable handling. These projects were aimed at the development of better handling methods for local commodities. Emphasis was placed on products which are grown for sale to hometown people. Studies were made of improved handling methods, the results of which are presented in this paper.

of loss of sugar is doubled. Conversely, if temperature is reduced by that amount, sugar will remain in the ear twice as long. In addition, respiration builds up heat in corn, which further dissipates the sugar content. This heating also causes yellowing and drying of the husk, loss of flavor, shriveling, and toughening and discoloration of the kernels.

After harvest, if ears of corn are held at 32 F. the loss of sucrose is only 3.5 per cent in 24 hours, 10.3 per cent in 48 hours, and 15.3 per cent in 72 hours. If, however, the corn is packed in bags or crates without ice and held at 86 F. the temperature of the product will often reach 90 to 120 F. in a matter of a few hours. In other words, at high temperatures corn loses 60 per cent of its sucrose in a day's time.

This is important because ordinarily corn cannot be moved from the field to the store, then to the consumer in less than 24 hours. More than a day usually elapses between harvesting and cooking, often as much as 48 hours, and sometimes the period is even longer. Therefore, under these conditions, the consumer buys perhaps 40 per cent or less of the sugar content which nature put into the corn, despite the fact that the corn was grown only a few miles away.

Certainly this substantiates the fact that improved procedures are not only desirable and necessary for marketing of local corn, but they emphasize the importance of taking precautionary measures as soon as the corn is removed from the stalk. Delays of 6, 12 or 18 hours result in great deterioration of the product.

The Value of Ice

In areas where research has been conducted to find out how ice could be adapted to local methods of handling corn, interest has been aroused. Farmers, growers, and state extension people have been prompt to appreciate the value of ice. In most cases the real hurdle has been to develop economical and efficient methods of doing the job.

In general, the recent projects are not so much for the purpose of finding the value of ice on corn as to determine the most practicable application of it. Corn is marketed in many different ways. In some markets, it is handled in bulk. In others, it is packed in crates. Still others make use of bags. Studies in the various areas have been planned to investigate the use of ice as related to that section's method of marketing. This approach has led to emphasis being placed on various icing procedures.

Icing sweet corn from truck at the field---- Only a few minutes have elapsed between the time this corn was harvested and icing

Icing Procedures

Where corn is handled in bulk, attention has been given to layer icing and top icing of trucks. This, of course, refers to loading the vehicle with alternate layers of corn and crushed ice. Then the load is top iced, wrapped in a tarpaulin and hauled to market. The cooling is reasonably effective, but the refrigeration is lost at the wholesale market or chain store warehouse when the corn is removed from the truck unless it is reiced or refrigerated in some other way.

In the handling of corn in bags, tests have included placing ice between the layers of bags and over the entire load. This procedure, of course, means that the refrigeration is disturbed when the truck is unloaded. Some have made use of hydrocooling to remove field heat from corn in bags or crates. This method simply means that the packages are sprayed with or submerged in 32 F. water until the desired temperature is reached. Although this is a very effective means of removing field heat, if the desired temperature is to be held, the product must be refrigerated throughout the channel of distribution. This is especially difficult when lots are broken and transfer of ownership occurs in the wholesale market.

For corn that is packed in crates, package icing has been found to be very effective. Best results have been attained by placing 2½ dozen ears of corn in the crate and covering it with 10 to 12½ pounds of crushed ice, then another layer of corn and another layer of ice. Lower temperatures are possible if a paper inner liner is used in the crate. This type of package cools the corn quickly and the refrigeration accompanies the product until the ice is melted. Lots may be divided in the wholesale market or chain store warehouse without losing the refrigeration.

Some of these methods do a better job than others, but one thing is sure, all are much superior to handling the product without any refrigeration. There is need for further work in many areas to develop and perfect methods of integrating the use of ice into present handling procedures. During the past summer our Association and the National cooperated with Ohio State, a food chain and a large grower in sponsoring such a project.

Methods of Using Ice Latest Project

It was the opinion of the group that our study should include all steps from grower to consumer. We wanted to develop a method of using ice in the harvesting and packing which would not only do a good job in protecting field freshness and quality, but would be simple and economical and acceptable to the grower.

Next, we wanted to deliver a completely refrigerated product to the chain store warehouse in a manner which would conform to the company's present methods of doing business.

We were desirous of keeping the corn refrigerated as it moved to the warehouse, while in the warehouse, and enroute to the retail store without expensive equipment or excessive labor. Finally, we wanted to know more of the effectiveness of the iced display in the store compared to other methods of display.

The Research Committee of the National had been giving this entire subject a lot of thought. It came up with the suggestion of placing the corn and ice in a wet strength paper bag similar to, but larger than the one which is in common use for de-

livery of fifty pounds of prepared ice. We decided to experiment with this method of packing.

As soon as the corn was picked, it was placed in the bag with the ice. The original plan called for 2½ dozen ears and a layer of 12½ pounds of ice, another 2½ dozen ears of corn and another 12½ pounds of ice. In other words, each bag was to contain 5 dozen ears of corn and 25 pounds of ice. The bags were to be closed and kept in a vertical position for several hours. Actually, we were unable to get the correct size bag in time for the study so we used our standard size wet strength paper bag in which we sell 50 pounds of ice. We packed 4 dozen ears of corn and 20 pounds of ice in it.

The chain agreed to assign 9 of its retail stores to the project. Six were to sell corn which had been iced at the farm and three were to sell uniced corn. Three of the six were to make use of iced displays and three were to display the field iced corn in mechanically refrigerated cases. The three which were handling un-iced corn, of course, were to display it on dry racks.

Each day the grower stopped at the ice plant and picked up his ice. As the corn was picked and graded, it was packed in the wet strength paper bags along with the ice. The college people supervised the operation and kept all of the records.

The packaged corn was delivered to the warehouse late in the afternoon. Here the lots were kept overnight and divided for delivery to the retail stores. Bags were not opened, except for inspection, until they reached the retail store the following morning, at which time the corn was placed on iced and mechanical displays.

Opens New Market

Well, what did we learn? We think this study opens a new and effective method of handling sweet corn. We think you are going to see and hear more of it. We hope you will eventually receive some benefit from it. We believe it is a big step toward putting local corn icing in the bag, in the bag for the grower, in the bag for the merchant, and in the bag for the iceman.

Although we need more research in order to perfect the procedure and determine such things as the amounts of ice which should be used as temperatures fluctuate, we found that ice used in this manner does an effective job of removing field heat. The wet strength bag provides some insulation in addition to serving as a convenient and satisfactory container. The moisture from the ice keeps the corn succulent, fresh and colorful.

This method of icing resulted in temperatures at the time the corn reached the store in the forties and fifties as compared with temperatures in the upper seventies and low eighties for the un-iced product. In the stores, the iced displays looked cool, fresh and appealing, and they were just that. Corn on the ice ranged from the low forties in the bottom ears to the mid fifties for the top layers. These temperatures were well below comparable locations in the mechanical cases.

Sales Figures Tell Story

The figures on sales of iced corn make an impressive story. After all, this is the pay off. This shows customer preference. This indicates whether or not it can be a means to increased profits for the store. This shows whether or not it is worth the grower's effort to buy ice and offer a better pack.

The sales of refrigerated corn were two or three times the volume of corn sold from dry displays in stores which offered corn that was not iced in the field. Sales for the iced corn were consistently ahead of that in mechanical cases which had been iced from farm to store. The un-iced product, needless to say, made a sad showing.

The grower was enthusiastic about the use of ice in wet strength paper bags. The bag appealed to him because it was less expensive than new corn crates; it was not difficult to pack and handle; it furnished a simple, quick and efficient means of removing field heat; the refrigeration went through the entire marketing channel in contact with the product; and it was preferred by the buyer. Actually the proof is already available. The grower who cooperated has placed his order for bags next year.

The chain found that this method of handling had many definite advantages. The corn was refrigerated. It came to the warehouse in a compact package along with the refrigeration. There was no problem of reicing or refrigerating in the warehouse or on the trucks. The self-contained package made it easy to divide lots for delivery to retail stores. The refrigeration was not lost until the ice was completely used up or the package was unpacked at the retail store. The quality and appearance of the product was greatly improved and sales shot up enough to pay the cost of the ice.

American Service Reports Reduced Earnings

AMERICAN Service Company of Kansas City which operates fifty-four ice plants in forty-two southwestern and southeastern cities, reported sharply reduced earnings in 1950, as compared with a year previous. The net profits amounted to $112,791, compared with $303,017.

Earnings in 1950 failed to cover the $3.00 preferred requirements, as net was equal to $2.30 a share. In the preceding year the earnings were equal to $1.23 a share on the outstanding 91,555 shares of common after dividend requirements of $191,-148 on the preferred and class A stock.

Ice sales for the year were $2,496,-115 against $3,202,197 a year earlier, a decrease of 22 percent. Tonnage sales amounted to 363,230 against 450,198, reflecting unfavorable weather conditions during the summer months and to competition of mechanical refrigeration. "Other sales" consisting of washing machines, radio and television sets, electrical appliances, frozen foods, groceries were $2,298,708, compared with $1,815,122, a gain of $483,586.

The company reported there was no income tax liability in 1950, while in 1949 this amounted to $160,000. Due to the additional depreciation allowable for income tax purposes which resulted from the re-aging of machinery acquired prior to 1934 and losses experienced on the disposal of properties, there was a tax loss.

During the year $359,573 was spent on capital additions and improvements, as compared with $563,395 in 1949. The budget for this year contemplates only nominal expenditures for motor car replacements as the operating properties are in such condition that no large outlay should be required for some time.

The company retired 566 shares of preferred stock. The cash position of the company prior to 1950 was adequate to permit depositing in the retirement fund the proceeds received from the sale of fixed property. However, due to the shrinkage of cash in 1950 as result of decreased profits, it was found necessary to use the proceeds realized from the sale of property in the amount of $100,607 as working capital. Thus no additional preferred will be acquired this time. The company, however, must deposit the fund after three years in the retirement reserve.

Since reorganization in 1934 a total of 29,179 shares of preferred, representing 37.32 percent of the total issue, have been retired.

Demonstrator Shows Meat Dealers How To Use Ice in Retail Counters

A series of demonstrations for retail meat dealers in the St. Louis area has been conducted at the Hadley Technical School by Fred Buzen, a member of the staff of the Poultry & Egg National Board. The course is designed to teach retailers how to handle and merchandise poultry and eggs, and is being conducted in conjunction with the U. S. Department of Agriculture. The government has allocated money from Research and Marketing funds. It is planned to bring these classes to all 48 states. (Similar schools were held in Elkhart, Ind. and Kansas City, Mo.)

Mr. Buzen, having been a butcher himself, gives practical demonstrations on the cutting up of chickens, showing how the merchants can increase their sales and profits by selling the various parts of the chicken instead of whole chickens. He then had those present in the class practice the methods he has shown them. The classes are limited to 30 so that everyone in the class has an opportunity to practice the cutting of the chickens and setting up eye-appealing displays on crushed ice.

One of the main products that is needed for the demonstration is ice. Mr. Buzen stresses the fact that chickens keep better, look better and sell faster when displayed on ice. He urges the merchants to use ice for their displays even though they might have mechanical display equipment in their stores.

Mr. Buzen has been complimented for this excellent presentation of this program by the merchants who have attended the classes. This is an excellent opportunity for the ice industry to capitalize on ice usage for poultry displays and thereby increase their ice sales.

Upper left: Class of meat retailers being conducted by Fred Buzen of the Poultry and Egg National Board at Hadley Technical School, St. Louis, Missouri

Lower left: Members of the class are being shown how to cut up dressed chickens under direction of Mr. Buzen

Upper right: Mr. Buzen shows Walter Rathert and V. A. Esphorst of St. Louis Association of Ice Industries how to cut up chickens

Lower right: Mr. Buzen stands behind dressed and cut up chicken displayed on bed of crushed ice in retail meat counter

Barnes Elected President Barnes Ice & Coal Company

AT A meeting of the board of directors of the Barnes Ice & Coal Co., Gary, Ind., held February 6, David L. Barnes was elected president replacing Fred A. Bowlby.

Mr. Bowlby who had been president of the company for five years, has assumed a controlling interest in the Lake City Ice & Coal Co., Michigan City, Ind. A resident of Gary since 1907, Mr. Bowlby has been associated with the Barnes company for thirty years and had headed the firm since the death of George F. Barnes in 1946. Although he will retire from active direction of the business, he will still retain a stock interest in the company.

The new president, David L. Barnes, is a son of George F. Barnes who established the company and managed it for several years. He has assumed active management of the company with Harold W. Keck as operational manager. Other officers elected were: vice president, Dr. Victoria Barnes; treasurer, Mrs. George F. Barnes; secretary, Vera M. Hass.

Oil Company Shows Ice On Television Program

A SMARTLY-UNIFORMED iceman and a 50-pound block of crystal-clear iceman's ice were the chief "props" in a recent Gulf Oil Company commercial on the "We The People" television program. The program is telecast each Friday night over the NBC network.

When brought into the studio (in a canvas delivery bag), the ice block had a can of Gulf Oil frozen inside. Emcee Dan Seymour asked the iceman to chip away the ice, then the can was opened and Seymour demonstrated that the oil was still free-flowing.

Gulf consulted N.A.I.I.'s advertising agency, Donahue & Coe, for "technical advice" on the commercial, and the agency bent every effort to see that ice delivery put its best foot forward. Certainly viewers were shown a sample of neat, modern service which did credit to the entire ice industry.

Old Ice Business Closes

THE oldest business in Ochelata, Okla., the ice business started in 1910 by Tracy Stainbrook and his father, James Stainbrook, was closed recently. The community will be served by an ice truck from Ramona every other day, according to a news announcement.

Florida Growers Need More Refrigerator Cars

HUNDREDS of acres of fresh vegetables are being plowed under or are going to seed in Florida's rich farming country because of a shortage of railroad refrigerator cars, according to news reports. Gordon Stedman, secretary-manager of the Growers and Shippers League, said at Orlando that the state needed at least 3,000 freight cars at once to ship vegetables north.

"The situation is the worst in years," Stedman said. He added that there are only 893 cars in Florida at present and 796 en route.

Mount Taylor Improving

THE condition of Mount Taylor, well known among ice men as former executive secretary of the National Association of Ice Industries, continues to improve according to reports from Washington. Mr. Taylor offered his resignation as executive secretary at the annual convention held in Chicago last November and after a few months' leave of absence, his resignation was accepted. After spending a few weeks in a Washington hospital, he is now at his home in suburban Washington where he plans to stay until further plans materialize.

The Ice Industry

E. L. "Pop" Gunn Advanced

E. L. GUNN, JR., for many years head of the American Service Company, Southeastern Division, Atlanta, Ga. has been named vice-president and general manager of all American Service properties. Mr. Gunn, who will continue residence in Atlanta, says that no other organizational changes have been made or are contemplated. He is a director of the National Association of Ice Industries and for some years has served as chairman of the Operating Committee of the Public Relations and Advertising program.

Island of Ice Unusual Christmas Display

AN "Island of Ice," consisting of a mound of snow ice with a Christmas tree in the center and surrounded by cakes of ice, was used as a Christmas display by Paul H. Andres president of the Southwest Ice & Dairy Products Co., in front of his home in Oklahoma City. The interesting exhibit stopped traffic nightly and won third prize in the Junior Chamber of Commerce contest. A spotlight turned on it made it even more spectacular after dark.

Fort Wayne Ice Company Displays Church Built of Ice

A CHURCH made entirely of ice by the personnel of the Polar Ice & Fuel Co., Fort Wayne, Ind., was exhibited at the Polar plant during the 1951 Christmas season. Twenty five tons of ice were used in its construction. It was lighted inside with red, white and blue Christmas lights, and a large flood light was focused on it from the top of the ice plant.

Those doing the actual construction were Richard Fischer, manager of deliveries; Forrest Hodges, plant foreman; J. Moore, plant engineer; C. Arnet, trick engineer, and A. Watts, salesman. The lady in the picture is Miss Shirley Potts, bookkeeper.

The local newspapers used the picture, giving front page publicity, and hundreds of people came to see it during the holidays. The company was very well pleased and is planning something similar for next Christmas.

Reports from Unit Ice Associations

More Ice Merchandising is Theme of 33rd Annual Ohio Ice Convention

THE 33d annual convention of the Ohio Association of Ice Industries met in Columbus, February 25 to 27, 1951. Public relations, ice merchandising in its various aspects, reports on research work, reports of officers and committees and enjoyable entertainment made up the program. In line with other conventions, the attendance was down from previous years, but this did not detract from the interest.

The annual banquet with dancing and floor show following was held Monday evening. For the ladies a group breakfast and luncheon was held Monday under the direction of Mrs. J. L. Glass, Middletown, chairman of the Ladies Entertainment Committee.

Jacobs Resigns

At the final session Tuesday, Guy W. Jacobs, recently elected executive secretary of the National Association, proffered his resignation as secretary of the Ohio Association, a position he has filled continuously since 1928. Mr. Jacobs explained that the only reason for his resignation was that he expected his new responsibilities to take all his available time. He emphasized that he was still in the ice business and expected to continue as an active member of the Ohio Association

Opening Session

At the opening session a tribute with a suitable plaque was awarded to Harold J. Rolph, Ironton, who served as president for 1949-50.

Reporting on the work of the association during the past year, President Jesse L. Glass, Middletown, said the officers and directors had held several meetings during the past year to carry on the work of the association. The convention program he said, had been planned to provide practical business information. A note of optimism was injected when he said that since the country had had an unusually cold winter, they might look forward to a hot summer with increased ice sales. The high point of the association work during the past year, he said, was the sweet corn icing program carried on by the Ohio Association with the cooperation of the National Association of Ice Industries, the Ohio Experiment Station and the Kroger grocery company. This study, Mr. Glass said, opened up a vast new field for the use of ice. (A paper on this subject presented by Mr. Glass at the National Ice Convention is published on another page of this issue.)

Guy W. Jacobs made his report as secretary-treasurer. The finances of the association are in excellent shape with a very comfortable cash balance. Mr. Jacobs then reviewed the history of the association which was organized January 20, 1919 with Joseph Murphy of Toledo as the first president. Mr. Jacobs said he took particular pride in the fact that the Ohio Association had been one of the most consistently active unit ice associations and was the first to affiliate with the National Association.

The organization of the association was then changed to a non-profit corporation. The details of this reorganization was explained and presented to the convention by Hudson Jeffreys of the Crystal Ice Company, Ironton.

Ohio Officers for 1951

President, Stuart Muenter, Tiffin

Vice-president, Jack Wightman, Akron

Acting Secy-treas., Miss Elizabeth Shannon, Steubenville

The Legal Side

Reporting on government activities as they affect the ice industry, Wm. T. Jobe, general counsel of the National Association of Ice Industries, said there is a definite trend toward government controls and these controls in some instances will be more drastic than during the last war.

Annual banquet of the Ohio Association of Ice Industries, Columbus, Ohio, February 26, 1951

Its impact on the ice industry will be felt in the draining of manpower into war industries and the armed services. Draft deferments, he said, will be increasingly difficult and the problem will become more drastic as time goes on. The cost of labor will not be less and probably will be more. The ice industry, although it will have a reasonable degree of freedom from regulations, will face scarcity of materials and the inconvenience of controls. The lesson to be drawn from this, he said, is that plants, delivery trucks and all other physical equipment should be put in good running order now while materials are still available.

Robert H. Smith of Willard in a talk on the heritage of America said that while the demand for ice last season was a discouraging and devastating one, we have a great country bequeathed to us from a great heritage. Although we have freedom in our social and business life, all citizens have to work to keep this freedom and make it work.

Public Relations

Substituting for George Steers, chairman of the Public Relations Department of the National Association who was unable to be present, Guy Jacobs reported on the National Public Relations Program. While results of National Ice advertising are difficult to point out, he said, actually it has a strong impact on the buying public, not only in publicizing ice but in counteracting adverse publicity. He explained the advertising program for 1951 which will consist of advertising and publicity in trade papers, general magazines, newspaper publicity, showing of the film "Naturally Yours," and newspaper mats, billboard posters and recorded commercials for local users. The commercial field will be covered with advertising and publicity in trade papers covering the beverage field, retail stores, vegetable stores and distributors. Mr. Jacobs then displayed two large portfolios illustrating the extent and magnitude of the magazine advertising.

Ice Vending

Stewart Saunderson of Cleveland, discussing ice vending, said his company, the City Products Corp. operates a number of vending stations which they have found very profitable. He gave some of the high points of a survey on the subject conducted by the National Association showing records made by such stations in high, low and middle income groups, also locations of stations. This survey, he said, showed that stations located in the middle income neighborhoods are the best because they have a steady sale of all kinds of ice, block, prepared and cubed.

Results of Research

C. P. Austin, director of Research and Engineering Department of the National Association of Ice Industries, said that for some years the ice industry had been faced with the necessity of finding new markets to replace lost tonnage and this had required constant readjustment and searching for new markets. They had been successful as shown by sales of ice for retail vegetable icing, icing vegetables in the field, vending stations and many other new outlets. He then reviewed in some detail a survey on sales of ice to mechanical owners. This survey, he said, showed that in some areas as high as 80 per cent of mechanical owners buy ice for certain reasons. These 34 million mechanical refrigerator owners open up a huge market. Home freezer owners are also potential users.

As a means of drawing attention to ice vending stations, he suggested the use of three or four signs at intervals of 200 to 300 yards similar to road signs advertising vegetable markets and roadside stands. All these new uses are providing greatly increased outlets for ice sales, and others are being investigated such as icing fresh meat stores.

Ohio Safety Program

Gilbert P. Bush, chairman of the Safety Committee, reviewed briefly the association's program during the last year. Accident experience during the past year had been about the same as last year for both frequency and severity. Basic rates had increased from 95 to $1.09, not because of a lowered safety record, but because of increased compensatory rates. The Ohio ice industry, he said, has the lowest workmens compensation rates of any state in the union which, he thought, showed that the association's safety record has paid and will continue to pay.

Wm. Cowan of Cleveland, talking on the importance of a good safety program pointed out that without a definite program those in charge of safety are groping in the dark and much of their effort is ineffective. In his safety work, he had found that a chief preventative of accidents in and around the plant is good housekeeping. Direct accidents to delivery trucks had been decreased by adequate instructions on careful driving. Executives have learned that it is good business to prevent accidents and a good safety program will be well received by employees.

James H. Fluker, superintendent of Division of Safety and Hygiene, Industrial Commission of Ohio, complimented the association and chairman Bush on an outstanding job of safety. As a result of time and work put on it, he said, the Ohio Association enjoyed a very low rate. Accidents, he said, cost money that should be used in the business. Mr. Fluker then presented safety awards to the following Ohio ice companies for good safety work accomplished during the year: Crescent Ice Co., Alliance; City Products Corp., Toledo; Serv-Ice Delivery Co., Akron.

Merchandising in 1951

A panel discussion on merchandising in 1951 was conducted by Jack C. Wightman, Akron. Mr. Wightman said that this is a peculiarly fitting time for ice men to get together to actuate and prepare for the ice season ahead.

Jack Whitelock, Warren, pointed out that the ice selling picture changes only slightly from year to year, the same principles being involved. The first thing the ice man has to do is to sell himself, then he can transfer his enthusiasm to the customer. In all this talk about processed ice, he said, we must remember that sales of bulk ice provide our main source of income and it is our job to hold these sales. In the city of Warren, he said there are four or five housing projects and his company had been able to sell and have installed 1100 ice refrigerators in these projects. The industrial market should not be neglected, many manufacturing plants offering a market for ice for water cooling.

Wm. R. Sneed of Hamilton, pointed his remarks chiefly toward National Ice advertising. The ice industry, he said, has never done the amount of national advertising it should have done. If we had started advertising as we should have done some years ago, the problem of selling ice would not be the big one it is today. There will always be an ice industry, but to make it a good business, those working at it will have to go out and sell it to their customers and the public.

Mr. Wightman concluded the discussion by saying that while the ice selling job was the same as it always has been, the ice man now has more to work with through the information provided by the Research Department of the National Association. He urged all ice men to make full use of this material. While he had no quarrel with diversification, they must remember that their main job is selling ice.

Directors Elected

Following the report of the nominating committee, the following were elected directors: Bud Ottman, Cleveland; Jack Wightman Akron; Gilbert Bush, Jr., Gallipolis; Frank P. Sedler, Cincinnati and Ed J. Dager, Bucyrus.

Associated Fields

A panel discussion on associated fields of endeavor was conducted with Walter P. Blessman of Akron, acting as moderator.

Stuart A. Muenter, Tiffin, described a display room which they operated in connection with an ice vendor on the platform. This display room had been stocked with refrigerators and other ice-using equipment, being open from 4 to 8 p.m. and Sunday mornings during the time when the ice vendor is most active. It affords ice vendor customers a place to get change and at the same time the refrigerators and other ice-using equipment are there for them to see. This had not resulted in big sales, but it does pay its own way and builds customer satisfaction.

Ed. J. Dager of Bucyrus, centered his talk chiefly on the locker plant which his company installed about six years ago. This plant, he said, had been successful not only in bringing increased business but it also is a big help in retaining ice plant personnel during the winter months. Initial installation was 816 lockers and later, to meet the demand, an additional 800 were installed. The company operates a slaughtering plant and complete processing facilities. This, Mr. Dager said, they had found a natural sideline for their ice plant operation and it has been a very profitable operation.

James F. Merrick of Middletown, told about an appliance department which his company resumed in 1946 after the war. The original intention was to start selling refrigerators again, but to provide more income, they decided to add other appliances including such items as washers, radios, ranges, sinks, kitchen appliances, cabinets and television sets. They had found kitchen appliances and equipment especially desirable because they require no servicing which is greatly in contrast to television which requires a great amount of service. This, he said, has been a very profitable project and keeps the refrigeration department out of the red and has made adequate profit every year since it was started.

The afternoon was brought to an interesting and fitting close by the address "How's Your Attitude" by "Dusty" Miller, Wilmington, Ohio. Mr. Miller presented a humorous viewpoint of life and business. Undesirable situations arise, he said, and the manner in which we meet these situations determines our attitudes and management of our lives.

56th Indiana Ice Convention Plans for Better Year in 1951

ICE MEN of Indiana, in spite of unfavorable conditions and a poor ice season last summer, at their 56th annual convention discussed plans for building better business in 1951. The meeting was held at Indianapolis March 5-7 at the Lincoln Hotel. The attendance was down slightly from previous years, but the program, entertainment, exhibits and other features came up to standard.

Two get-together parties were held, Sunday and Monday evenings, two luncheons Monday and Tuesday, and the annual banquet and entertainment Tuesday evening. The banquet speaker, Dr. Wm. P. Allyn of Indiana State Teacher's College delivered an inspiring address on "Life-A Comedy of Errors."

Opening Session

The convention opened Monday morning with an address of welcome by David Copeland, former president. He was followed by C. D. Knight, president, who reviewed present conditions in the ice industry. Mr. Knight recalled that the ice industry during the last war had enjoyed greatly increased sales, with no effort on its part, and after the war this new business had gradually slipped away without anything being done to hold it. Now, he said, we are facing the same conditions and it is to be hoped that some attempt will be made to hold any new business that may come along. The ice industry needs, as it has always needed, better customer service, and this means better trained personnel, from management on down.

Robert W. Walton, executive secretary reviewed the work of the association during 1950. A field course presented by National Ice Marketing has been very successful, and this will be repeated in 1951. Three merchandising forums had been held. Offers to civic and luncheon clubs to provide speakers had been accepted in many instances and the film "Naturally Yours" had had a good distribution. Outstanding ice exhibits and displays had been presented at the Indiana State Fair, and similar displays had been presented at county fairs. Group insurance had been made available to members. The sweet corn icing program had been continued and an increased demand for ice for this purpose is quite evident. Future work of the association, he said, will consist in carrying on these activities and adding whatever is called for.

G. Elwood Hookey, of the Department of Distributive Education, Indiana University, who has been working closely with the association in its employee training program, gave a very interesting talk on selling. He said that Indiana ice men who represent management have been slow in selling their workers on the story of the American free enterprise system. American citizens, he said, have the highest living standard in the world and they should all be kept informed as to the reason and basis for this high standard. American workmen are reasonable and intelligent and they

Indiana Officers for 1951

President, J. R. Jones, Oakland City

Vice-president, F. J. Henneberger, Princeton

Vice-president, H. L. Dithmer, Indianapolis

Treasurer, Robert Seaton, Richmond.

Executive-secretary Robert W. Walton, Indianapolis

will respond to such an educational program. The training of delivery men is a year-round proposition and is necessary because they meet the public every day, he concluded.

Wm. T. Jobe, legal counsel of the National Association of Ice Industries, said it is difficult to predict the future, especially in times like these, but it would be a highly improvident group of business men who would not attempt to chart the future, both short and long term. The national picture now, he said, embodies shortage of manpower and materials, higher costs, higher taxes, controls, greater regimentation and other disturbances of a wartime economy. The ice industry, he said, probably will get through this coming season relatively free of controls, but beyond that time they may expect materials and supplies to become scarcer and more subject to controls. The wise ice man, he said, will not disregard these warnings of trouble ahead.

Management Panel

Herbert Porter, Polar Ice & Fuel Co., Indianapolis, prefacing a panel discussion on "Plans for 1951" said that the ice business had long been a profitable business but that they could not rest on past accomplishments. What the industry needs now is a definite plan that will produce results in sales. A good program for a salesman is to sell 50 pounds of ice a day. Commercial customers usually are not contacted personally and this naturally leads to customer dissatisfaction. The delivery men should have constantly kept before them their responsibilities and that their customers depend upon them. Adequate and continuous selling is all that will keep the ice business going.

David Barnes, Barnes Ice & Fuel, Gary, gave a general survey of his company's merchandising activities. Recently they have changed from company-owned to dealer routes and this has resulted in many improvements. Two ice vendors have been very successful. Among new markets being developed is truck icing from two service stations where gas and other services are available. They are working now on installing ice refrigerators in two housing projects. Excellent results were obtained from a training course given by the Ice Marketing Institute, which sold the employees on the importance and stability of the ice business. Recently they had bought a small ice plant in Gary which they closed and converted into a cold storage plant. In this deal they took over several hundred household customers. About two years ago they converted a room in one of their plants into an appliance store where they sell refrigerators and other ice-using appliances as well as a considerable line of other appliances including sewing machines, washers, and kitchen equipment. Since the first eight months this store has been operating at a profit.

Richard Fisher, Ice Deivery Inc., Fort Wayne, pointed out that since ice business was not good in 1950, that was one good reason why they should work on developing new ice markets. Last October they had started promoting vegetable icing in food stores in Fort Wayne and sold 47 iced vegetable counters. Another new project was poultry icing and now 16 stores are using ice every day for dressed poultry. The latest is using ice for fresh meat counters and here they believe is a vast undeveloped market. He offered as a good slogan for this merchandising work; "Business goes where it is invited and stays where it is taken care of."

Wm. T. Jobe, commenting briefly, recalled a war conference which he attended soon after joining the National Association which created for him an enthusiasm in the ice business which he has held to ever since. Ice men generally need to get together he said to adjust and recharge their enthusiasm in the ice business.

Concluding the discussion, Mr. Porter pointed out that party ice is a good-will and a good business builder because it puts ice in the best homes, where the door has been closed on ice for many years. Holidays, weddings, anniversaries, and other special events offer a natural market for punch bowls and other novelty items and they will bring good prices.

The National Picture

Following Tuesday's luncheon, Guy W. Jacobs, executive secretary of the National Association of Ice industries gave a report on the organizational set-up and work of the National Association. The rapidly changing economy, he said, has made changes necessary in all lines and the association will keep the members fully informed on these changes. Peace time activities will be continued and at the same time new developments will be taken care of. The association personnel is well qualified to do this and the ice industry, as a whole, is far ahead of where it was at the beginning of the last war, he said.

Regarding the work of the Public Relations Department, he described the ice advertising program for 1951 which will include general magazine advertising and publicity, trade magazine advertising and publicity, newspaper publicity, meeting unfavorable publicity, programs for local radio stations, vegetable icing exhibits, circulation of the film "Naturally Yours" and many other publicity media. Advertising will be carried in nine general magazines which have a combined circulation of more than 29 million copies. The commercial advertising schedule will be in 28 trade publications covering vegetable icing, beverages and the hotel and restaurant trade, with 134 separate advertisements.

Merchandising Forum

Opening a forum on merchandising, Charles Scheidler, Greenburg, Ind., said he had been very successful in arranging for talks to high school home economics groups in his community. The story of ice, he said can be told there very effectively. Many people think that a new mechanical refrigerator will provide the very best refrigeration, and it is up to the ice men to teach them and to show them that ice will do a better job.

Charles, Brock a grocer from Connersville, Ind., told about his experience with iced vegetables. He criticised the ice men for not doing a competent job of knowing and selling this method of merchandising fresh vegetables. Most grocers, he said, do not know what ice will do for them and the ice man should teach them these facts. Mr. Brock installed a 15-ft iced vegetable counter in his store two years ago with greatly increased sales and greatly decreased losses from waste. The best and quickest way for a grocer to make more money is to get into the produce business and do it right, and the only way to do it right is to use ice, he said.

B. H. Landing of the Lake City Ice & Coal Co., Michigan City, also talked on vegetable icing. Grocers, he said are constantly being approached by salesmen who want to sell them something. But the ice man can approach them on a basis of saving them money and increasing their sales. The ordinary loss on dry vegetable sales is about seven percent but with ice this loss is reduced to about 1½ percent. This is a big

selling point, but another important point is that ice will greatly increase their vegetable sales.

Robert Seaton, Anderson Ice & Coal, Richmond, Ind., told about a side line of merchandising water softeners started by his company about ten years ago. They now have about 2,000 customers, employ a full-time salesman and four full-time service men.

Vending Stations

Leonard Swartz, Irvington Ice & Coal, Indianapolis, talked briefly on ice vending stations. They have a number of such stations and they had learned that their location is very important. To be profitable, he added, they must have a consistent volume of sales. The survey on this subject made by the Wharton School of Finance and issued by the National Association, he said, is very thorough and informative and any ice man thinking of installing an ice vending machine should obtain a copy of this report and read it very carefully.

Al Trusty, Trusty Manufacturers Inc., spoke briefly on the "Flying Squadron" organized by the City Products Corp. for the specific purpose of selling iced vegetable counters. In an intensive selling campaign these men had sold 35 counters in Cleveland; 29 in Pittsburgh; 26 in Buffalo; and 26 in Chicago. Mr. Trusty also criticized ice men for not doing a better selling job to their grocers.

The State Legislature

Following a group breakfast Wednesday morning, the state legislative picture was outlined by Jack Reich, Indiana Chamber of Commerce. Mr. Reich emphasized that above all the state legislature needs a higher type of representatives, men who are competent, capable and sincere and that they should be elected from the standpoint of their ability rather than as democrats or republicans. The citizens then should make a point of getting acquainted with them and letting them have their views on proposed or pending legislation. Many local problems, he said, become state or even national problems because they are not taken care of by the people in their own communities. To prevent selfish legislation advocated by special interest, business and professional groups should all work together for the best interests of the people as a whole.

At the concluding session of the convention immediately following Mr. Reich's address, committee reports were presented and adopted and officers and directors were elected for 1951. The following new directors were elected: John De Prez, Shelbyville; A. C. Lemons, South Bend; W. R. Standish Bedford; Robert A. Yunker, Madison.

Michigan Ice Association Holds 34th Annual Convention at Detroit

THE 34th annual convention of the Michigan Ice Industries Association was held at Detroit, March 1 and 2, 1951. The attendance was good and the delegates were most enthusiastic in their desire to contribute to, as well as benefit by the discussions of the various subjects on the program.

President Walter Hintz presented the story of "The Changing Conditions in the Ice Industry," in which he traced the progress of the industry from the time of the ice man who left the cake of ice on the steps or lawn, to the present efficient and orderly distribution of all types of ice, such as block ice, sized ice, cubes, etc. He stressed the necessity for putting forth more selling efforts by the members of the ice industry, in order to meet changing conditions.

Vegetable Icing

The increasing sales efforts in vegetable icing, and the resulting increased acceptance of it by the retail produce dealers was discussed by George V. Warren, City Products Corp., Chicago, Ill. Mr. Warren and his company have done an outstanding job in this field, and his presentation of this subject was most beneficial to those in attendance.

The subject of research and the development of new markets for ice was handled most ably by C. P. Austin, Research Director, National Association of Ice Industries. His discussion of the vital subject of ice vending machines was particularly timely and informative. An open forum discussion of this topic was conducted by Mr. Austin at the Friday session.

H. S. Oderman, Detroit City Ice & Fuel Co., told about the "Job That Must be Done in 1951." He emphasized the fact that everyone must buckle down and go to work, and when this is done, improved business will be certain.

After a cocktail party Thursday evening, everyone boarded buses for the Elmwood Casino in Windsor, Ontario, Canada, where they enjoyed grand dinner and a good floor show. This was a party that will long be remembered by all who were there.

Michigan Officers for 1951

President, Joseph J. Oderman, Detroit, Mich.

Vice Presidents, Ollie Weber, Flint, Mich.; Leonard Borin, Detroit, Mich.

Secretary-treasurer, Edward W. Jackson, Kalamazoo, Mich.

Report from National Association

Opening the Friday morning session, Guy W. Jacobs, executive secretary, National Association of Ice Industries, discussed the ice industry from the National viewpoint and presenting practical, promotional, advertising, and all other aids offered to the members of the industry by the National Association. This was a very instructive and entertaining presentation.

Round table discussions were conducted on "Creating and Promoting New Markets," led by Bert Blackmer, Muskegon, Mich.; "Diversification," led by Leonard Borin, Detroit, Mich.; "Vending Stations," led by C. P. Austin, Washington, D. C.; "Economy in Operations," led by Walter Hintz, Detroit, Mich., and "Vegetable Icing," led by Ollie Weber, Flint, Mich. Many interesting and instructive ideas were developed through these discussions, and as evidence of the interest shown in this part of the program, adjournment was an hour or more later than scheduled.

The presiding officer of the Thursday session was Walter J. Hintz, president, and of the Friday session Joseph J. Oderman, vice-president and president elect.

Following report of the Nominating Committee the following directors were elected: Walter J. Hintz, Detroit; Joseph J. Oderman, Detroit; Leonard Borin, Detroit; Ollie Weber, Flint; Vernon Powell, Cadillac; Bert Blackmer, Muskegon; Wesley Brown, Benton Harbor; Wilbur Kooienga, Grand Rapids.

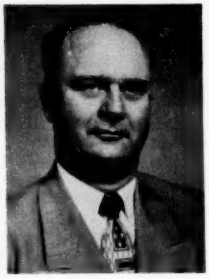
At the annual meeting of the board of directors, officers were elected as listed above.

In welcoming the new president, mention should be made of the fact that although he was suffering from an attack of the flu, he conducted the Friday session of the convention and took over the meeting of the board of directors, without complaint. Immediately after the convention he went to a doctor who put him to bed. Later reports are that he was well on the way to recovery.

Appreciation was expressed to the retiring president, Walter J. Hintz, for the fine way he has handled the affairs of the association during his tenure, and he was told that the association would continue to look to him for advice in his newly assumed role of past president.

Southwestern Convention Program Covers Major Phases of Ice Business

IN SPITE of an ice storm, covering the roads of northern Texas with a sheet of ice, the annual convention of the Southwestern Ice Manufacturers Association was held at Galveston, February 14 to 16. Although attendance was light the first day, as the convention got under way more members and guests arrived to bring the final registration up to expectations.



Roy A. Stamps, Gainesville, Tex.
President, Southwestern Ice Manufacturers' Assn.

To get to the convention ahead of the ice storm as it moved in, a number of the members left their homes in the Texas Panhandle as early as 3:00 a.m. and drove to Galveston, a distance of some 650 miles, and made the trip within the day.

It was an interesting program, providing factual down-to-earth discussions of the important conditions in the ice industry. The three major conferences covering selling and servicing, management of ice operations, and research for new and profitable markets, developed informative and encouraging experience of the practical ice men who led the discussions.

Social Events

All social events of the convention were well attended. These included the board of directors' dinner honoring the past presidents; dinner for the wives of those who attended the board of directors' dinner; tea for the ladies of the convention given by the president's wife, Mrs. Harry M. Park, and the informal Beachcomber's Party Tuesday evening. The closing event of the convention was the annual cocktail party, dinner, floor show and dance at which, according to Southwestern tradition, a certificate of appreciation was presented to retiring President Park, by the association's executive secretary counsel, General Weatherred.

The displays at the convention were of unusual interest and occupied all of the available space. As usual members of the convention found this display of much educational value.

In addition to the conferences, three major addresses were presented by Dr. Carl H. Moore, senior economist of the Federal Reserve Bank of Dallas, on inflation, controls and the business outlook; former Congressman Martin Dies on "Wake Up, America!"; O. T. Clark, Fort Worth, "Right Turn Off Easy Street."

Southwestern Officers for 1951

President, Roy A. Stamps, Gainesville, Tex.

Vice-president, Ralph H. Irvine, Palestine, Tex.

Treasurer, Jacob M. Irvine, Dallas, Tex.

Directors: Howard Campbell, Dallas, Tex.; W. Paul Faulkner, Lubbock, Tex.; H. N. Pierce, Dallas, Tex.; Wm. H. Pitts, Austin, Tex.; W. Clarence Stevens, Omaha, Nebr.; W. S. Cooley, El paso, Tex.; E. W. Frenke, Corpus Christie, Tex.; J. H. Gardiner, Waxahachie, Tex.; Elmo McGee, San Antonio, Tex.; T. D. Meacham, Monahans, Tex.

Mr. Dies gave an address that was patriotic and inspirational. He told about his experience as chairman of the Committee on Un-American Activities while a member of Congress. His address was of great historical interest because the position which he took during those days has been fully justified by events in recent years. Mr. Dies' warnings against the creeping influence of communism are matters of general public information. His address was heard by every man and woman in attendance at the convention as well as by a number of Galveston visitors and at the close, he was given a real ovation.

Ralph H. Irvine, Palestine, Tex.
Vice-president, Southwestern Ice Manufacturers' Assn.

The address by Dr. Moore on the timely subject of inflation, controls and the business outlook was a very interesting presentation. Regarding the question as to whether more inflation is in prospect, he said this depends on many factors including the fiscal policy of the government, rate of industrial production and the inconvenience of controls. However, he said, he did not believe government leaders or the people that they represent would have the political courage to apply the necessary controls to keep wages and prices from rising.

Regarding the outlook for business in 1951, he said the opportunity for profits will be good, but that there will be less freedom in the operation of most businesses because of the necessary wartime control. Virtually every business, he said, will be faced with an increasing shortage of labor. But most important in the business picture is the urgent need for increased efficiency.

The closing address by O. T. Clark, well-known among Texas ice men, was one of the features of the convention. In his own inimitable fashion, Mr. Clark expounded a measure of wit, sound advice and inspirational appeal which closed the convention in a spirit of friendship,

good humor, hopefulness and renewed determination. O. T. was at his very best and he was given a real ovation by his huge audience of friends.

Weatherred Honored

This convention marked the twenty-fifth anniversary of the employment by the Texas Ice Industry of Preston A. Weatherred, then "Colonel," as the secretary-counsel of the Southwestern Association. In recognition of his quarter century of service to the ice industry, the past presidents and old timers present at the convention, with Jodie Thompson as their spokesman, presented to General Weatherred a sterling silver cigarette chest. On the chest will be engraved the names of the donors, with appropriate inscription. A pleasing touch to the gift is that the names will be engraved in the informal signatures used by the donors in signing their communications to "The General." The presentation was made during the Beachcombers Party Thursday evening.

Convention Papers and Discussions

Other important phases of the program covered discussions of the future of the ice industry, processed ice as a commercial business builder, appliance sales, new federal controls, the vending machine, National advertising, research, air conditioning and new money from new markets.

Georgia Ice Manufacturers and Southern Ice Exchange Hold Joint Meeting

THE joint annual convention of the Georgia Ice Manufacturers' Association and the Southern Ice Exchange held at Atlanta, February 21 and 22, attracted a good attendance and the program presented was well above average. An interesting line of exhibits were on display and the annual dinner followed by a floor show, provided very enjoyable entertainment.

Georgia's new three percent sales tax, characterized as the "fairest in the nation" was described by W. H. Kimbrough, executive secretary to the Governor. This tax, Mr. Kimbrough said, provides for no exemptions and is in fact a retail sales and user tax levied on the consumer and paid direct to the state.

Charles S. Dudley, general manager of Associated Industries of Georgia, also commented on the new tax and explained that in addition to the usual retail sales, it provided also for levying a tax on equipment and supplies used in manufacturing, including ice.

Ice Advertising

Guy W. Jacobs, executive secretary of the National Association of Ice Industries, reported on the work and plans of the National association. The regular association work will be continued, he said, and in addition, all necessary contacts will be maintained with government agencies during the present emergency.

Mr. Jacobs then presented an outline of the 1951 ice advertising program which will include commercial advertising in trade papers, consumer advertising in general magazines, materials for local advertisers and other media used in former years. Commenting on the reduced tonnage assessment from 3 to 1½ cents per ton, he said the Public Relations Committee hoped to get support from a greater number of companies and that if the program is adequately financed they believe that the 1951 advertising program will be one of the most effective the industry had ever had.

Secretary Reports

R. W. Florrid, executive secretary of both associations reported that activities of the Georgia Association during the past year had been increased. Three very successful merchandising forums had been held during the year and they planned to increase this number to six for 1951. Other 1951 activities had included contacting chain stores and other large commercial users on the use of ice and this will also be continued. Commenting on the present emergency, he asked members to report any hardship cases arising under OPS regulations and said that these will be taken up through the proper channels. Mr. Florrid served under the OPA in the last war and he has had many years experience in association work.

A considerable part of the program was devoted to discussions of current problems of members of the two associations. Among these were sales plans, selling appliances, sales contacts, use of vending machines, ways of reducing costs, and selling more ice through new markets.

Regulations Ahead

Wm. T. Jobe, general counsel of the National Ice Association, warned his audience that they were facing regulations and controls very similar to what they went through during the last emergency. These regulations and controls, which are not being pushed at the present, will continue to become tighter and in some cases will be more drastic than previously. Deferment of men under 26, he said, would become increasingly difficult and the influx of men into war industries and into the armed services will soon begin to cause serious shortage in manpower.

With all of this, he said, it is the problem and duty of the industry to maintain its present plant and equipment and keep it in the very best possible condition. As to price controls, he said that at the present ice prices are frozen as of the January 19-25 levels. However he said that this order is to be interpreted as more of a profit control than price control and is subject to later interpretation. He expressed the belief that where manufacturers had had established differentials in winter and summer rates to independent dealers, this will be worked out on an acceptable basis.

He urged members of the industry to respond to any request from the National Association with respect to statistical or other data that might be needed in order to establish the

Georgia Officers for 1951

President, James W. Ford, Columbus, Ga.
Vice-president, R. Lambert Williams, Claxton, Ga.
Executive secretary, R. W. Florrid, Atlanta, Ga.

Southern Ice Exchange Officers for 1951

President, W. F. Robertson, Savannah, Ga.
Vice-president, J. F. Kilbourn, Panama City, Fla.
Executive secretary, R. W. Florrid, Atlanta, Ga.

industry's essential position under any government regulation. In closing he announced that during the times ahead, the National Association staff will do its best to represent the industry before all government agencies and to keep the members completely advised.

Frank H. Pumphrey, City Products Corp., Daytona Beach, Fla., discussing the outlook for 1951 said it would be more difficult than the industry had ever known before because of increasing taxes, increasing costs and controls and regimentation. But, he said, the industry is fortunate in having a competent staff in the National Association and assured them that their problems would be handled efficiently through either the National or their local associations.

Commenting on the Florida association program, he mentioned the merchandising forum and the short courses on management held at the University of Florida and said that these had made it possible for ice company representatives to go back home and put into effect the sales and management policies, the worth of which was far greater than the cost of sending personnel to these courses.

North Carolina Ice Association Holds 42nd Annual Convention

THE 42nd annual convention of the North Carolina Ice Association was held at Charlotte, N.C., March 12 and 13 with a good attendance and an interesting program. Approximately 125 ice dealers and manufacturers from throughout North Carolina were registered for the convention. In the election of officers Lewis H. Powell was reelected secretary-treasurer for the 14th consecutive year.

The convention opened Monday morning with a welcome address by Douglas Aitken, mayor pro-tem of Charlotte. Addresses at the morning session were delivered by James B. Volger, secretary of the North Carolina Food Dealers Association and William T. Jobe of Washington, general counsel of the National Association of Ice Industries. The president's report was presented by D. M. Howell of Greensboro.

Manpower Short

At the Monday afternoon session Col. Thomas H. Upton, North Carolina Director of U. S. Selective Service said that in event of another all-out war, manpower will be the nation's most critical resource and that they must husband and utilize it carefully. Col. Upton explained the effect the new selective service law would have on mobilization and discussed the effect of selective service on man power for industry. He said that under the new law which permits the drafting of 18-year old youths the new reservoir of man power should provide under the present induction and rejection rate all requirements for the armed forces for the next eight months. And with the number of youths who will become 18 years of age in that time enough will be available probably to meet the requirements for an additional two months he declared. The ice industry probably will be declared an essential industry in the event of another all-out war he said, because of the need of ice for the preservation of foodstuffs.

At the Monday afternoon session also talks were made by Henry E. Kendall, Raleigh, chairman of the North Carolina Employment Security Commission and Guy W. Jacobs, Washington, executive secretary of the National Association of Ice Industries.

Taking the place of C. P. Austin, chairman of Research and Engineering Department of the National Association who was unable to be present because of illness, Guy W. Jacobs discussed the work of the technical department of the association. He reviewed briefly the merchandising possibilities developed through ice vending machines, supplying ice for vegetables in food stores and in transit and credited the Research Department with uncovering and making available to the industry, pertinent facts in regard to these and other new markets for ice.

At a later session, Mr. Jacobs spoke in his capacity as secretary of the National Association and former director of the Public Relations Department. He explained in some detail the organization set-up of the National Association and then described, and illustrated with slides and portfolios, the ice advertising program.

Two panel discussions, one on merchandising and one on operating on present day regulations, brought out information of considerable practical value.

One of the highlights of the convention was an address "Opportunities in North Carolina" by Roy A. Palmer, merchandising and advertising manager of the Duke Power Co., Charlotte, N.C. Mr. Palmer said that North Carolina was a good place for any business man who made a real effort to merchandise his products.

The annual banquet was held Monday evening at the hotel, followed by an address by C. W. Grimes, humorist and philosopher.

North Carolina Officers for 1951

President, D. M. Howell, Greensboro.

Vice-president, Lawrence C. Rose, Wilmington.

Secretary-treasurer, Lewis H. Powell, Raleigh.

Executive committee: J. H. Lane, Charlotte; L. G. Geddie, Mount Olive; J. H. McGill, Charlotte; George Sherrod, Greensboro; E. J. Jeffries, Goldsboro; E. L. Lowie, Gastonia; W. H. Sherrill, Hickory; R. V. Sisk, Charlotte, and A. J. Brinson, Lumberton.

Northwest Association Of Ice Industries

L. F. MARSH, Secretary

WITH a new program of work, following the annual convention March 29 and 30, the Northwest Association of Ice Industries will be more active. There is need for more activity, and recognition of this by the members is quite evident.

Conditions in the ice industry in the Northwest section are causing some concern, chiefly as regards costs and profits. Many companies are facing demands for higher wages, while the combination of adverse weather and drop in tonnage because of mechanical competition makes an adequate profit very doubtful, without an increase in ice prices. The only answer seems to be some relief from the freeze of ice prices.

Canadian Spring Ice Conference

A SPRING conference will be held by the Canadian Association of Ice Industries at Hotel Kerby, Brantford, Ont., April 10, starting at 10:00 a.m. The program has been arranged so that it will be of special interest to operators of small ice plants.

Refrigerated Warehousing Industry

NATIONAL ASSOCIATION of REFRIGERATED WAREHOUSES

Division of American Warehousemen's Association

Executive Offices
TOWER BUILDING, WASHINGTON 5, D. C.

Executive Vice-president
WM. DALTON, WASHINGTON, D. C.

Secretary
JOS. H. COLQUITT, WASHINGTON, D. C.

President
J. P. JOHNSON, WASHINGTON, D. C.

Vice-president
A. B. EFROYMSON, CLEVELAND, OHIO

Treasurer
C. E. SIMMON, OKLAHOMA CITY, OKLA.

THIS MONTH IN BRIEF

Activated carbon filters have been developed by the British Ministry of Food to deodorize cold storage rooms for shell eggs. They are installed over the intake opening of the forced air refrigerating system.

The cause and prevention of black spot on shrimp has been studied and a report issued by Louisiana State University. Some important results are revealed in the report on this investigation.

Manual handling of commodities have been eliminated and costs have been cut by installation of powered fork trucks and pallets in an Eastern refrigerated warehouse.

Review of results of investigations show conclusions as to maximum permissable concentration of ozone for non-continuous occupancy.

Studies on the refrigerated storage of candies show that it helps to retain quality and makes it possible to hold the finished products over a longer period of time.

Carbon Odor Filters For Egg Storage Rooms

THE British Ministry of Food has designed and produced activated carbon air filters to be installed on a temporary basis to deodorize cold storage rooms prior to storing shell eggs in them. The carbon is contained in flat panels made of two perforated metal plates, and the panels are installed in a frame over the intake opening of the forced air refrigerating system.

The desire of the Eggs Division of the British Ministry of Food to foster the oil dipping and cold storage of eggs to even out seasonal fluctuations in the egg trade gives rise to the need of more cold storage space for eggs.

No one will deny the benefit which both the public, the British egg producer and indeed the National economy will derive from this modern trend but the cold storage of eggs presents a veritable batch of technical problems. Apart from the physical changes which occur in eggs if the storage temperature falls below 30 F, they have the property of absorbing odors, no matter how slight.

From the cold storage viewpoint, it is most essential that cold storage chambers be properly prepared beforehand to receive batches of first quality oil dipped eggs, and to do this efficiently, the Cold Storage Division of the Ministry of Food has installed a number of activated carbon air deodorizing filters in some of the Ministry of Food's cold stores. The filters are accommodated in the suction intake chambers.

Principle Is Adaptable

Although designed specifically for use in the Ministry's cold stores, the principle could be applied to any

A view of the activated carbon air deodorizing filter designed by the Cold Storage Division of the Ministry of Food.

other cold store. The activated carbon air deodorizing filter is capable of rapid erection, dismantling and dispatch from one store to another as required, the secret being that each set of equipment is packed into a specially constructed packing case into which sections have been built to receive and hold each piece of equipment.

The over-all height of the filter frame on to which the filter panels are fixed is 9 feet 3¼ inches. It is 6 feet 9½ inches wide and can accommodate ten filter panels each of which are 3 feet long, 2 feet wide and one inch thick. Two perforated zinc frames form the back and front of each filter panel and are 0.042 inch thick, the holes being 0.050 inch in diameter.

Charcoal Absorbs Odors

Each filter panel is filled with a special grade of granulated charcoal which has the property of absorbing undesirable odors present in the storage chambers. The odors are the natural consequence of storing such commodities as apples, which like many other foodstuffs, have characteristic smells attributable to the commodity itself and not in any way due to deterioration or other ill effects. These odors are difficult to disperse in any case, whether in cold stores or other commodity stores, but when consignments of eggs are expected, exceptional measures are necessary to protect the foodstuffs from the damaging effect of taint.

A number of complete activated carbon deodorizing units have been constructed and are available for erection as desired. When required for use they are erected in the air suction intake chamber of the store needing deodorizing. The arrangement of the filters does not materially affect the speed or flow of the air stream and assuming the atmosphere of a cold storage chamber to be changed on an average of fifteen times every hour, deodorizing is a fairly rapid process.

Filters Absorb Odors

The filters are adapted from a principle already known to cold store engineers but to the layman, the principle is best explained by its similarity to the action of the war-time gas mask, which employed granulated carbon to absorb poison gas from the air.

The degree of maneuverability of the filter panels can be judged from the fact that only one unit was erected to enable photographs to be taken illustrating both sides of the frame. Engineers at the Hockerill Cold Store, Dunmow Road, Bishops Stortford, Herts., erected the first complete unit received by the Ministry of Food, and merely altered the position of the filter panels to reveal other positions and reverse views. Constructional obstructions encountered in cold stores can be easily circumvented by fitting the filter panels vertically instead of horizontally.

The efficiency of any commercial undertaking can often be judged by its ability to adopt new methods and in this respect, the Ministry of Food has not been lacking in either ideas or initiative.

Warehousemen Elect Two Honorary Life Members

TWO veterans of the industry who have made significant contributions to refrigerated warehousing were given special honors at the Boston meeting of the National Association of Refrigerated Warehouses. Elected to Honorary Life Membership were George Horne and Ralph Stokell. After the vote by the convention, Dr. Mary Pennington read the following tribute to Mr. Horne:

George A. Horne

"The N.A.R.W. is itself honored in making George A. Horne an honorary member, for none stand higher in the esteem and the appreciation of warehousemen than this modest gentleman who pioneered many an advance in the art and science of the utilization of low temperatures.

"George A. Horne was born and schooled in Plainfield, N. J., going then to Lehigh University from which he graduated in 1899 with a BS in Chemical Engineering. He spent a year in the laboratory of Thomas A. Edison and then became Chief Chemist for the B. T. Babbitt Soap Company in charge of research.

"From 1911 to 1940 he was a vital part of the Merchants Refrigerating Company of New York City where he served as vice president and chief engineer. This was when he published his researches on "Compound Ammonia Compression," regarded as classics since 1922; and such practical warehouse problems as "Cold Storage Operation Data" and "Refrigerated Warehouse Operating Costs."

"He dealt not only with engineering problems but with the biological questions which the conservation of perishables brought to the warehouseman. During the fruit fly infestation of Florida, he demonstrated the practicability of holding citrus fruit at 32 F, though the growers specified 36 to 38 F, and observation long antedating our present practices.

"Politically a passionate liberal, and far ahead of popular opinion, he was advocating in 1924 the basic creed of the UN; namely, the broad principle that international disputes shall no longer be settled by force.

"The couplet which he is fond of quoting, and by which he still lives, is:

Make science the method
Make service the motive."

Ralph C. Stokell

Mr. Stokell has completed 50 years in the refrigerated warehouse and affiliated industries since his beginning in the employ of Swift & Co. in 1900 at Boston. Later he was with the Hollis-Rich Cold Storage Co. and then became treasurer of the Boston Terminal Refrigerating Co. in 1911. Moving to Chicago in 1922, he was an employee of local warehouses.

The Cold Storage Division of the American Warehousemen's Association in 1924 was becoming increasingly active in its membership services and the directors in their search for a well qualified and experienced warehouseman to head up the association's office on a full-time basis, selected Mr. Stokell as its first executive secretary in which capacity he remained until 1928 when he assumed the position as general manager of the National Cold Storage Co., New York City. In 1930 and 1931 he served as treasurer and vice president of the National Association.

Recently his association activities included the treasureship of the New York State Cold Storage Association and the chairmanship of the New York City Association of Refrigerated Warehouses. In January 1950 he was elected president of the American Institute of Refrigeration, Inc.

Warrington Joins Staff of Poultry Institute

S. T. WARRINGTON who served for some years as secretary of the National Frozen Food Locker Association until January 1, 1951 has joined the staff of the Institute of American Poultry Industries. Mr. Warrington is especially interested in the subject of pre-packaged frozen poultry.

CAUSE AND PREVENTION OF BLACK SPOT ON SHRIMP

The cause of black bands and areas which develop on shrimp after they are taken from the water has been determined and preventive methods have been established.

E. A. FIEGER
Department of Agricultural Chemistry and Biochemistry
Louisiana State University
Baton Rouge, La.

TWO years ago I had the honor and privilege of presenting the Louisiana State University findings from the studies of shrimp (TRRF project No. 2) entitled, "Causes and prevention of undesirable changes in the quality of fresh and frozen gulf shrimp in refrigerated storage." Today Director Diehl has again honored us by asking for a further report on our work and in the short time allotted I shall endeavor to summarize our results on black spotted shrimp and black shrimp.

What is meant by the term black spot and black spotted shrimp? This is a condition which at times develops in shrimp, both whole and headless, during refrigerated storage. In appearance a black spotted shrimp may have one or several black spots or band usually at the base of shell segments or appearing across the back of the tail where shell segments overlap.

In general the discoloration appears to begin developing in the membrane which connect together the two ends of overlapping segments. When the black spot condition is severe they are spoken of as black shrimp. Gross examination of such black shrimp show pronounced black bands where shell segments overlap, giving a banded or zebra appearance to the tail. The tail and head fins are black. The crawling legs change color first at the joints and this change finally progresses over the entire leg, while the swimming legs become black at the tip ends. The top and sides of the heads are affected, so that the interior becomes a black soft or mushy mass and the carapace or shell becomes flexible instead of its normal stiff consistency.

The liquid which exudes from the shrimp is black and is spoken of by the shrimp fishermen as acid, but in reality is alkaline. In fully 75 per cent of the black spotted shrimp we have examined, the chitin or shell has been punctured or eroded away. Since the edges of the pierced portion are smooth and not jagged it is believed these holes in the shell result from chemical solution and not from mechanical injury.

Cause

Having described what is meant by black spot we may ask the question, what causes this condition to develop and after knowing the cause it is logical to ask what can we do to prevent its development? As far as we can ascertain no previous investigation of black spot on shrimp have been made. Some in the shrimp industry contend it is caused by "ice burn," because if temperatures are too low the ice does not melt and black spot becomes a problem. Envoldsen and Strassburger at the Food Technologist symposium on Fisheries held at San Francisco in 1949 stated that hydrogen sulfide and sulfides in general were responsible. Last spring I got out on a limb and stated a mold was responsible. Today I am in the process of sawing off that limb.

The investigation and the results reported by Dr. Fieger show how this research has brought a very valuable and practical answer to a great problem in the marketing of shrimp. This project, supported by The Refrigeration Research Foundation, gives material aid to all concerned with shrimp which is an important factor in our diet, commerce, and the refrigerated warehouse industry. The solution to the Black Spot problem will aid in expanding the market for shrimp.

About a year and a half ago we isolated a fungus or mold from a typical black spot, which when inoculated onto sterile shrimp produced black spots when the treated shrimp were incubated at 70 F. or higher. These spots were not typical of ordinary black spot. Further investigation however, showed that this organism would not develop at 32-35 F. or lower at a sufficient rate to explain the rapid development of black spotted shrimp or black shrimp under refrigerated condition. In simple words this mold, and one other we obtained, are not the things which causes characteristic black spot so well known in the trade.

Through further generosity of a grant from TRRF we were able to continue these studies this past summer. The results of this work indicate that:

(1) black spots are not caused by microorganisms and

(2) black spots do not result from some chemical change in the shrimp brought about by microbial activity.

Enzyme Action

Since this work excluded microorganisms as the primary cause it appeared logical to investigate the possibility of enzymes or organic catalysts as the causal agent. Now enzymes or organic catalysts are substances which cause chemical changes to proceed at a faster rate, an example of an enzyme which all housewives are familiar with is rennin or junket which is obtained from calves stomach and which causes milk to curdle. Another example would be the substance in blood called thrombin which causes it to clot. I have, therefore, devoted my time since last September to this phase of the work. The following are the important points of the results I have obtained.

1. Whole shrimp suspended in water in flasks closed either with a rubber stopper or a cotton plug did not develop spots after 125 hours storage in crushed ice. The odor of the shrimp was that of fresh shrimp. The liquid had a slight brown color.

2. The same set up as described above was used but with air bubbling through the suspension of shrimp and water. After 72 hours, several shrimp

Presented before the joint NARW-TRRF annual meeting February 4, 1951, Boston, Mass.

had developed black spots and after 125 hours 90 per cent of 18 shrimp had black spots on their heads, 70 per cent had them on their tails. The odor of the shrimp was that of fresh shrimp, but not quite as good as fresh shrimp. The liquid was black.

3. When pure oxygen was bubbled through a set-up similar to that previously described after 54 hours one shrimp had a black spot and at 125 hours 100 per cent of 18 shrimp had black spots on both sides of their heads and 17 had a black spot on their tails. Their odor was not quite as good as the control. The liquid was black.

knew would be converted to the black substance melanin if these enzymes were present in the shrimp tissue. The container was packed in ice and air was bubbled through the solution. Within 6 hours the liquid had turned black and black spots were evident on the shrimp in contrast to the 75 hours required in the previous experiment. All 20 shrimp had black spots on heads, joints of crawling legs, head and tail fins and tails. Most of the tails had pronounced black bands where shell segments overlap.

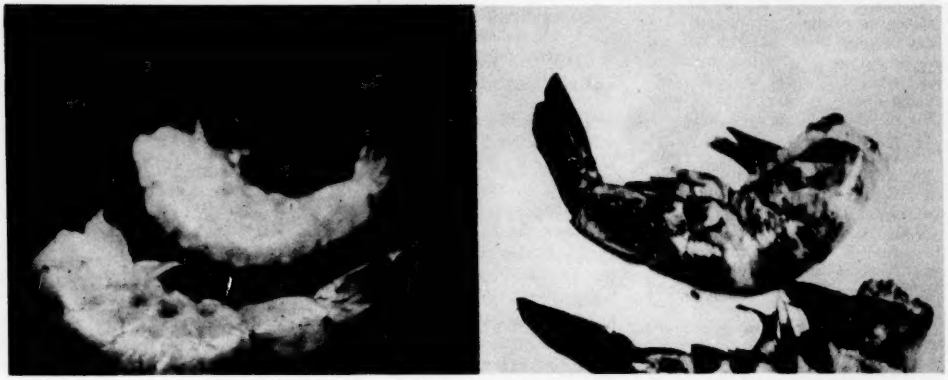
Further evidences that an enzyme system is involved in black spot formation are the following facts:

1. Boiling over a free flame for one minute a water extract from

question of distribution of the enzyme in the shrimp. It is present in the head, in the fins, legs and the shell and membrane of the tail. It is not present, however, in the tissue of the tail.

Prevention Methods

Now that I have described the manner in which black spot and black shrimp develop we are in a position to answer the question what can we do to prevent their development? In order to have spots develop three conditions must be fulfilled, namely the enzyme system and the chemical substance which is changed to the black material must be present and lastly air or more specifically oxygen must be available.



How Black Spot develops in 5 hours. Photo at left shows normal shrimp. At right the same shrimp 5 hours later after they have been held in a solution of the enzyme substance with air bubbling through. Note how shell segments, legs and tails have turned black

These results prove that air, or more specifically the oxygen of the air is required for black spot development, and also strongly suggest an oxidative enzyme system is responsible. By oxidative enzyme system we mean a group of substances present in living tissue, both animal and plant, which increases the ease or rate of using oxygen. Many of the brown and black pigmentations found in nature, such as black feathers, wool and hair and the brown color of freckles and sun tan, the pigmentation of Addison's disease and of malignant tumors are caused by the oxidation of tissue substances to brown or black substances. These colored substances are called melanin. To prove that oxidative enzymes cause black spot development the following experiment was performed.

Whole shrimp were suspended in a solution containing a substance we

shrimp shells and membranes completely prevents development of black spots even in the presence of this substance. Enzymes are known to be destroyed by boiling for such a short period of time.

2. Spots develop best when the solution is neither acid nor alkaline, ie. when the solution is neutral. Enzymes are sensitive to changes in acidity or alkalinity.

3. Black spot development is inhibited by chemicals known to inhibit oxidase enzymes.

4. Black spot will rapidly develop on shrimp in the presence of chemicals which are known to be oxidized or changed by oxidase enzymes.

5. Chemical compounds which cannot be affected by oxidase enzyme systems will not cause black spots to form on shrimp.

Having shown that an enzyme system is involved naturally raises the

If any one of these three materials is lacking, black spot cannot form on the shrimp.

The chemical substance which becomes black and the enzymes are naturally present in the shrimp and there isn't much we can do about it. We can prevent the change from taking place by certain chemicals, such as prussic acid, carbon monoxide or hydrogen sulfide. The Food and Drug officials might more than frown on their use since they are rated as poisonous. So we are limited to the third substance required, the air.

You recall in the first experiment I mentioned that spots did not form when shrimp were suspended in water in a closed flask. By simply limiting the amount of air in contact with shrimp we can prevent black spot development. Packing shrimp in water and ice in containers and

(Continued on page 64)

February 28 Cold Storage Holdings

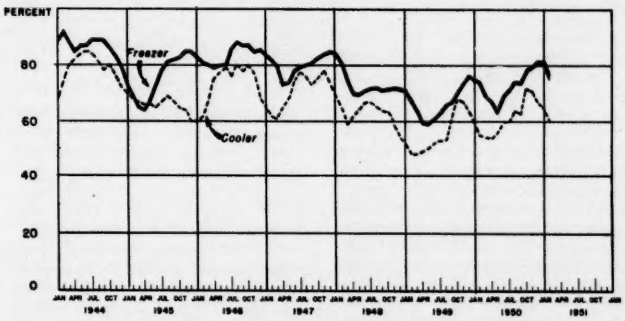
A GREATER than average decrease in occupancy of both cooler and freezer space in public storages took place during February. On February 28 cooler occupancy, at 60 percent, reflected a drop of 5 points during the month. The average decrease for this time of year is 3 points.

Freezer space was 76 percent occupied on February 28, a drop of 4 points since January 31 which compares with an average decline of 2 points. All regions showed decreased utilization of cooler and freezer space with the exception of the Mountain region where occupancy in coolers and freezers rose 15 and 2 points, respectively. Freezer space in several cities was 85 percent or better occupied while only one city, Detroit, had a cooler occupancy of 85 percent.

A net out-of-storage movement of one-half billion pounds reduced the weight of cooler and freezer-held commodities to 4 billion pounds on February 28. The 2.1 billion pounds of cooler items in storage on this date reflects a reduction of 16 percent of the January 31 cooler weight. A year ago there was a 21 percent decrease in cooler weight during February. All cooler items except nuts and nutmeats, shell eggs, sausage, canned meats, lard and pork fat reflected seasonal withdrawals from storage during the past month.

Freezer commodities decreased in weight by 8 percent in comparison to a decrease of 6 percent during February of last year. Net withdrawals of freezer items during the past month, except frozen eggs, reduced the weight in freezers to 1.9 billion pounds on February 28.

Fresh apples in storage on February 28 were almost twice average holdings for this time of year. Withdrawals during the month of 7 million bushels left 20 million on hand as compared with 13 million bushels in store a year ago. Average February withdrawals during the 5-year period ended 1950 were 6 million bushels. Seasonal decreases were also reported in stocks of pears which were down to 581,000 bushels on February 28. National holdings of potatoes, onions, celery, peanut meats, and other nuts in shell and shelled were in greater supply on February 28 than a month earlier.



Occupancy of public refrigerated warehouses, 1944-1951

Frozen fruits in storage by the end of last month amounted to 424 million pounds as net withdrawals during February totaled 8 million pounds. Last year, 14 million pounds moved from storage, while the average February withdrawal was 22 million pounds. Except for frozen apples, orange concentrate and other fruit juices, which reflected seasonal gains, the other frozen fruit items on hand February 28 were reduced as withdrawals ranging up to 11 million pounds were reported. When compared with previous February 28 holdings, current supplies of frozen fruits were at an all-time high.

Frozen vegetables were also at an all-time February 28 high with 330 million pounds in storage. This amount was 36 percent greater than average and 8 percent above the holdings last year. The net movement out

TABLE I—COLD STORAGE HOLDINGS IN PUBLIC, PRIVATE AND SEMI-PRIVATE WAREHOUSES, APPLE HOUSES AND MEAT PACKING PLANTS (000 LBS.)

	Feb. 28, 1951	Jan. 31, 1951	Feb. 28, 1950	Five-year Average
Meat and meat products, lbs.	940,880	959,886	815,578	837,358
Lard and rendered pork fat, lbs.	89,448	89,321	81,174	121,192
Frozen poultry, lbs.	242,126	284,623	260,523	258,989
Creamery butter, lbs.	52,861	75,329	92,886	27,675
American cheese, lbs.	138,721	155,117	149,004	102,071
Other cheese, lbs.	17,690	17,764	11,912	14,062
Shell eggs, cases	164	75	735	610
Frozen eggs, lbs.	32,190	31,157	73,159	88,782
Apples, bu.	20,198	27,273	12,502	11,470
Frozen fruits, lbs.	423,991	431,711	265,204	326,192
Frozen vegetables, lbs.	329,925	375,269	305,316	242,861
Frozen fish, lbs.	107,263	130,880	105,818	99,488

TABLE II—PERCENTAGE OF SPACE OCCUPIED BY PUBLIC COLD STORAGE WAREHOUSES (APPLE HOUSES EXCLUDED)

	Net Piling Space (000 cu. ft.)		Feb. 28, 1951 (%)		Jan. 31, 1951 (%)		Feb. 28, 1950 (%)		5-Year Average (%)	
	Cooler	Freezer	Cooler	Freezer	Cooler	Freezer	Cooler	Freezer	Cooler	Freezer
New England	2,777	5,208	58	84	64	88	52	79	50	75
Middle Atlantic	35,460	29,889	59	77	64	82	49	72	55	78
East North Central	27,636	25,201	66	80	69	86	59	75	60	78
West North Central	9,427	15,597	62	84	74	88	73	84	63	82
South Atlantic	8,925	6,310	53	77	57	81	55	76	60	82
East South Central	2,877	3,181	66	78	70	80	66	80	67	79
West South Central	7,285	7,060	58	61	60	62	60	58	65	74
Mountain	1,498	2,227	65	73	50	71	65	77	61	81
Pacific	16,298	22,196	55	66	61	72	48	68	56	69
United States	112,183	116,869	60	76	65	80	55	74	58	77

TABLE III—PERCENTAGE OF SPACE OCCUPIED BY PRIVATE AND SEMI-PRIVATE REFRIGERATED WAREHOUSES AND MEAT PACKING PLANTS (APPLE HOUSES EXCLUDED)

	Private and Semi-Private Warehouses						Meat Packing Establishments					
	Net Piling Space (000 Cu. Ft.)		Space Occupied—Per Cent Feb. 28, 1951		Jan. 31, 1951		Net Piling Space (000 Cu. Ft.)		Space Occupied Feb. 28, 1951		Jan. 31, 1951	
	Cooler	Freezer	Cooler	Freezer	Cooler	Freezer	Cooler	Freezer	Cooler	Freezer	Cooler	Freezer
New England	183	296	66	74	67	73	61	.....	77	.....	.....	.....
Middle Atlantic	1,336	1,737	50	81	55	82	1,408	264	84	87	86	84
East North Central	6,358	5,660	59	69	64	68	4,413	1,335	89	89	90	87
West North Central	561	2,379	88	79	98	80	12,411	5,983	91	90	92	90
South Atlantic	482	2,065	69	74	79	67	919	238	87	100	86	100
East South Central							351	110	90	90	83	88
West South Central	51	22	82	45	.....	.....	1,297	610	93	87	100	100
Mountain	104	6	93	.....	.....	.....	648	391	89	99	95	99
Pacific	3,671	3,314	31	61	46	66	2,722	522	97	96	97	96
United States	12,746	15,479	52	71	59	71	24,230	9,453	91	91	92	91

NOTE: Blank spaces indicate that insufficient returns were received.

of storage during February was 45 million pounds which was the greatest ever reported for this time of year. Green peas reflected a 13 million pound reduction; lima beans 8; snap beans 6; and sweet corn 5 million pounds. Other frozen vegetable items, except broccoli, fell off from 1 to 4 million pounds.

Net withdrawals from storage of 22 million pounds of creamery butter during February reduced national holdings to 53 million pounds. The seasonal decline was twice the average February reduction, but stocks were still above average by 25 million pounds and below last year's supply by 40 million pounds.

American Cheddar cheese holdings, down to 139 million pounds by February 28, reflected a net reduction of 16 million pounds. Total cheese stocks amounted to 162 million pounds as compared with 164 in storage last year and 118 million pounds on hand February 28 during the 5-year period ended 1950.

A less than average increase in shell egg stocks brought national holdings on February 28 to 164,000 cases which was only a little more than a fourth of the average supply for this time of year. Frozen egg holdings increased 1 million pounds last month, thereby bringing the total on hand up to 32 million pounds as compared with 73 million pounds in store a year ago and 89 million pounds on hand this time during the 5-year period ended 1950.

A record February net withdrawal of 42 million pounds of poultry reduced national holdings to 242 million pounds by the end of the month. This seasonal decline was 20 percent greater than the withdrawal last year and almost 70 percent greater than average.

Total meats in storage amounted to 941 million pounds on February 28 which compares with 816 in storage last year. During February some 19 million pounds of meat products were withdrawn from storage. Beef stocks were down to 148 million pounds as 13 million pounds moved out of store, while pork showed a net reduction of 8 million pounds leaving 660 million pounds on hand February 28.

The net withdrawal of pork stocks was in contrast to the 17 million pound increase reported during February for the 5-year period ended 1950 and compares with 10 million pounds withdrawn from storage last year. Current holdings were, however, more than 20 percent greater than average and about 15 percent above the stocks of last year.

Lard and rendered pork fat stocks reflected slight gains during February and reached the total of 89 million pounds, which was slightly more than last year's supply.

Frozen and cured fishery products in storage last month totaled 124 million pounds, a decrease of 24 million pounds from a month earlier. Frozen fishery products amounted to 107 million pounds as compared with 106 million pounds in store last year and 99 million pounds stored at the end of February during the 5-year period ended 1950.

Storage Outlook

Reduction in public cooler occupancy during February was greater than average, but comparable to the change reported a year ago. Last year a 4-point decrease during February was followed by a point decline during March to mark the end of the downward cycle in cooler occupancy. The 5-year average pattern also indicates that the seasonal low should be reached by March 31, but any significant increase in the storage of shell eggs during March would result in increase cooler use which would make the 60 percent reported on February 28 the low for the year.

Freezer utilization down 4 points during February should continue on its downward cycle until spring. Larger than average withdrawals of poultry and frozen vegetables and butter undoubtedly contributed to the greater than average reduction in freezer occupancy. Should these commodities continue to move out at a rapid rate, the occupancy decline during March should be greater than the 3 to 5 point drop indicated by previous performance.

Canadian Holdings of Fruits and Vegetables

THE Dominion Bureau of Statistics of Canada, Agricultural Branch, reports the following commodities held in cold storage on February 1, 1951.

Apples in cold storage on February 1, 1951 amounted to 4,511,000 bushels compared with 6,101,000 January 1, 1951 and 5,005,000 bushels February 1, 1950.

Frozen fruit holdings in storages and factories February 1, 1951 amounted to 14,758,000 pounds as compared with 16,722,000 pounds January 1, 1951 and 13,447,000 pounds February 1, 1950.

Stocks of frozen vegetables in storages and factories on February 1, 1951 amounted to 9,835,000 pounds as compared with 11,398,000 pounds January 1, 1951 and 6,295,000 pounds February 1, 1951.

Pacific Northwest Chapter Elects Officers

AS A climax to the regular annual meeting of the Pacific Northwest Association of Cold Storage Warehousemen held at the Athletic Club in Seattle, January 9, the following were elected officers of the chapter: President, Earl F. Swanberg, Seattle; vice-president, Arthur E. Soli, Everett, Wash.; secretary-treasurer, Wm. L. Baker, Seattle; directors: Alex P. Olsson, Portland; Dick Lamb, Freewater; Lynn Mills, Portland; Dr. Geo. M. Anderson, Lynden, Wash; Elizabeth Nye, Spokane; and Paul Henningsen, Portland.

MODERN HANDLING EQUIPMENT

Powered fork trucks and pallets eliminate manual handling and cut costs in multi-floor Borden Company warehouse in New York Central freight terminal, New York City.

A COMBINATION of several types of bulk handling equipment is utilized in warehouse operations of the Borden Company in the St. John's Park Freight Terminal of the New York Central Railroad in New York. The dairy company has space on an upper floor which requires the use of elevators. The storing and removal of the goods is a joint operation between the company and the railroad. Close cooperation between the two in choice of methods and equipment has brought about significant reduction in costs with speed in the operation.

Occupying some 50,000 square feet on the third floor of the freight terminal building The Borden Company, during the course of a year, receives and ships an approximate 3,000,000 pieces of merchandise. This is in the form of cartons, drums and barrels, which contain such food stuffs as cheeses, coffee and milk the latter in dried, condensed or evaporated form.

The number of refrigerated warehouses built to utilize power driven transporting and stacking equipment continues to increase. Meanwhile most of the cooler and freezer space is in multi-floor structures. Some of these are using power equipment to store pallet units. Others have not been able to reconcile maximum space utility (fixed cost considerations) and promised reduction of direct costs (labor and tools). The Borden Company reports success in this endeavor by methods detailed in this article.

Moved by Elevator

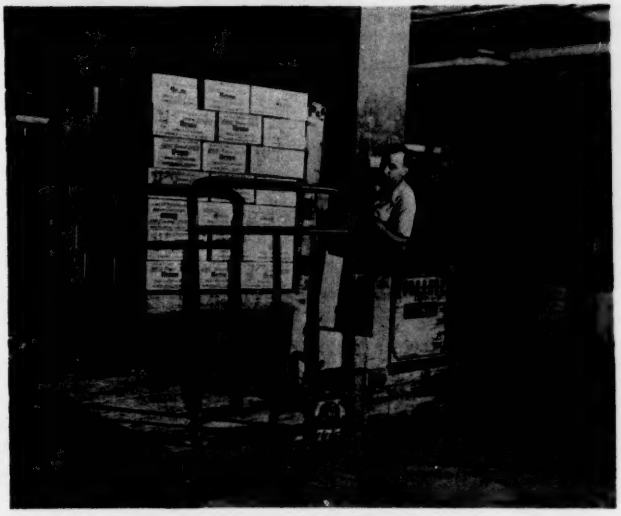
Goods arriving by freight car are moved by elevator to the third floor warehouse area on pallets. These have been placed on 4-wheel flat trucks. The incoming material is palletized at the freight car. The flat trucks are moved from the elevators and discharged on the third floor. Upon delivery, electric powered fork trucks, owned and operated by The Borden Company, take the pallet loads off the flat trucks, move the loads to assigned aisles and tier them in stacks. In the case of cartoned goods the layers are built in locked loads, assuring stability in stacking. Drums and barrels also are palletized in predetermined patterns and tiered in storage.

Two divisions of The Borden Company—Grocery Products and Cheese—occupy the third floor warehouse space. Each division operates its own fork trucks. The Cheese Division places its merchandise in refrigerated areas immediately upon receipt. These areas have space assigned for "soft" cheeses and for other types. The electric fork trucks were specified because they can work in and out of the refrigerated areas without danger of contamination of product, or upset of rigidly controlled temperatures.

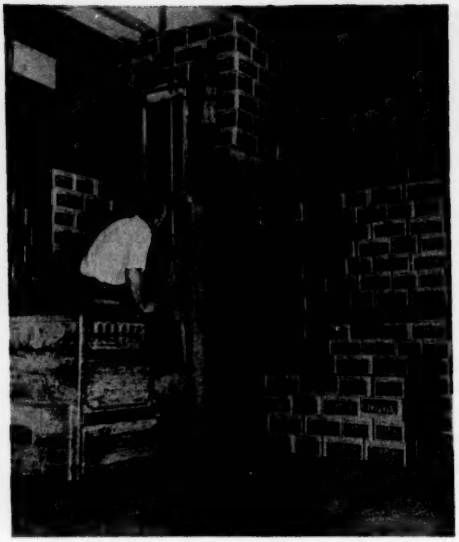
Full use of the cubic area is made by the Grocery Division warehousemen in stacking palletized loads of product, while in the Cheese Division use is made of racks within the refrigerated areas for holding palletized loads.

Palletizing

Freight handlers spot flat trucks at the cars and palletize the inbound merchandise. As the "flats" are loaded they are pushed—if within a short distance—to an area adjacent to the elevators servicing the building. If the cars are at some distance from the elevators the "flats" are coupled into trains which are hauled to and from elevators by battery-electric tractors.



When rail shipments of merchandise are received by The Borden Company at its warehouse space in St. John's Park Freight Terminal, operated by the New York Central Railroad in New York City, it is palletized by the railroad's freight handlers and delivered, by elevator, to Borden's quarters on the third floor. The delivery is made on 4-wheeled push trucks which are "spotted" at, or near, the elevator door. Electric powered fork trucks pick up the palletized loads, move them to designated areas and tier them ceiling-high. Since adopting this method of handling, Borden warehouse officials say approximately 80 per cent more goods are handled with an expenditure of considerably less man hours than formerly.



The end point with high piling quickly accomplished is a familiar sight since pallets and electric fork trucks have come into such wide use. What happens on the way from the railroad car in this case has been developed to suit the particular layout and conditions.

One of the 2,000 lb capacity electric fork trucks operated by The Borden Company, removes a palletized load of merchandise from an elevator. This merchandise, received in over-the-road trucks, was palletized at truck's tail gate, moved by pallet handling hand truck to the elevator and transported to The Borden warehouse area on the third floor of the terminal building. Elevator capacity is such that from eight to ten palletized unit loads are transported at a single trip. In outward shipment of orders the method of procedure in handling is in reverse.

Double-Door Elevators

The elevators servicing the Terminal are double-doored, permitting quick discharge, or loading. As they are discharged of their loaded "flats" those which have been discharged previously, and which have been cleared of their pallet loads, are taken aboard for movement to the rail dock platform. The benefit to the New York Central lies in the fact that it receives the empty flat trucks soon after delivery to The Borden Company. If the cases were to be handled manually, the return of the empties would probably be a matter of hours instead of minutes. The advantage to the tenant is that time also is saved by handling income material in unit loads, rather than piece by piece.

Shelves or bins are provided to give free access to all pallet loads in this refrigerated section where cartons of packaged cheese are stored.

As the flat trucks are delivered on Borden's floor, they are removed by Borden employees, according to Henry V. Maus, Manager of the Grocery Products Division, so that the fork truck operators do not have to travel any great distance to reach them, or to operate their trucks in limited space. As an idea of the speed in which loads can be handled through this method, a carload of merchandise, numbering anywhere from 1,000 to 3,000 cases, can be entirely warehoused in approximately one hour.

Truck Loading

In outward shipment, it was stated by Mr. Maus, Borden outlets in the Greater New York Area are serviced by highway trucks. In this operation the fork trucks and elevators again are coordinated, but this time pallet-

(Continued on page 62)

THE PRESENT STATUS OF OZONE

Maximum permissable concentration for non-continuous occupancy shown by review of published investigations. Effectiveness depends upon moderately high relative humidity

ARTHUR W. EWELL*

TODAY there are large modern ozone plants yielding, per unit, up to the order of one pound of ozone per minute. They attain such high output, either by high electrical potential or high frequencies, or both. The efficiency has been increased to 50 gr. per kw hour in two ozonators: The American Welsbach and the German Siemens & Halske.

The demands for considerable amounts of ozone come from purification of public water supplies, sterilization of the air in large cold storage plants, (particularly in egg and apple rooms), manufacture of synthetic chemical products, etc.

There is also a demand for small ozonators in limited refrigerated storage, special food storage and processing, increasing the aroma of small fruits, etc. Control of odors in toilets, kitchens, etc., where the maximum concentrations of ozone are of the order of a few tenths of one part per million, may be attained either with small ozonators or ozone-producing ultra violet lamps.

All uses of ozone are due to its very high oxidizing power. In common with such gases the results attained are determined by the concentration and duration of application. Prolonged stay in the presence of any strong oxidizing gas may be injurious to humans, depending upon the concentration and the duration of exposure. If the concentration of ozone is in excess of one part per million, it is common practice to turn off the ozone when employees must be in the room for several hours. In cold storage plants, for example, the ozone is often off during stacking or removal of eggs in cases or apples in boxes.

Toxicity of Ozone

The possible toxicity of ozone, if either the concentration or the duration of exposure is large, has resulted in restrictions, the latest of which is that published in the "1950 Heating, Ventilating and Air Conditioning Guide" of The American Society of Heating and Ventilating Engineers, which states that ".01[1] - .05 parts per million parts of air is allowable in comfort air conditioning. Above this limit there is a pungent, unpleasant odor and perhaps respiratory distress, depression and stupor." . . . The only reference is to "British Medical Journal, June 25, 1932, page 1182," which states that "A concentration which would damage bacteria in the air of a room would be more than ten times stronger than could be borne by the occupants. It takes thirteen parts of ozone per million of air to affect bacteria." "Thus a concentration which would damage bacteria in a room would be more than could be borne by the human occupants." "The value of ozone in sterilizing metropolitan water obtains results described as bacteriologically perfect."

In this article in the "British Medical Journal" there is only one reference, namely, to an article by Hugouneng in "Revue Generale des Sciences, April 15, 1932, p. 201:

Purifying Atmosphere

Extracts (translated)—

"The usefulness of ozone as an agent for purifying the atmosphere is confirmed." "Good results are obtained with doses which have no unfavorable effects." A table is given of the great reduction of bacteria by ozone. "The greatest success with ozone has been in water purification, the results being regarded as perfect." (Note that the article unfavorable to ozone in the British Medical Journal respecting the destruction of bacteria in the air by ozone is refuted in the only article to which reference is made.)

The recommendation of this "Guide" being far from acceptable, other recommendations will be presented.

Allowable Concentration

In the February 1947 number of "Quick Frozen Foods," pages 112 and 113, there is a summary by the writer of specifications of "Allowable Ozone Concentrations" as follows:

I. (1936) Bureau of Standards, 1936, p. 20 (Odor Masking or Destruction)—"Maximum allowable Concentration *0.5 parts per million of air.*"

II. (1936) Monograph on Toxic Gases by *"Henderson and Haggard of Yale University,"* 1936—"Maximum concentration allowable for prolonged exposure, *0.5 - 1.0 ppm*".

III. (1939) *W. N. Witheridge and C. P. Yaglou of Harvard University* found that the body odor of 95 subjects from "the poorest social economic station, largely adults, (W.P.A.)", in a small room, was neutralized (masked) by 0.015 ppm of ozone permitting a 50 percent decrease in admission of outside air. Their conclusion was that *0.04 ppm of ozone is the upper allowable limit in occupied rooms.*

(At a very pleasant and interesting conference with Prof. Yaglou at his office on November 19, 1949—Prof. Yaglou emphasized the word "Occupied." He stated that "it was not his intention to advise restriction to these low concentrations in such applications as food storage and such processing as the "Tenderay" method, but only to rooms which are literally occupied." He called to my attention the statement in his paper that "0.3 - 1.5 ppm inhibits fungus and mould growth in cold storage rooms." He expressed disappointment that his restrictions to much lower concentrations had been assumed to be applicable to "unoccupied" rooms.)

IV. (1940) A committee consisting of C. K. Drinker of Harvard University; P. Drinker of Yale; Haggard of Yale; Hamilton of Harvard; and Bowditch, Director of Hygiene, Mass. Department of Labor; gave the toxic limit of ozone as 1 ppm (code published in 1940).

V. (1943) J. W. Dalla Valle, a prominent authority upon Air Conditioning, in 1943 gave in "Industrial Press" *1 ppm* as "the probable safe limit for men and animals."

VI. (1947) Federal Security Agency, Public Health Service: C. D. Yaffe, Senior Sanitary Engineer, Chief Field Section, Division of Industrial Hygiene—letter of Novem-

*A. W. Ewell, Ph.D., for many years Head of Physics Department, Worcester Polytechnic Institute; Consultant Westinghouse Electric Corporation and Welsbach Corporation.

[1] It is of interest that the thirteen ppm is also given in the 1934 Guide of The American Society of Heating and Ventilating Engineers.

ber 30, 1949: "The maximal allowable concentration (M.A.C.) recently accepted by the American Conference of Government Industrial Hygienists is *1.0 parts per million.*"

VII. (1950) Dr. C. E. Thorpe, a member of the scientific staff of Armour & Co., Chicago, published in the February 1950 number of "Industrial Medicine and Surgery," page 49, an article in which he concludes that "20 parts of ozone per million, by weight of air is *non-toxic!*"

The writer believes that the seven papers above comprise the most important contributions to the toxicity of ozone. It will be observed that three—IV, V and VI—recent, careful and thorough investigations by outstanding authorities, permit a concentration of 1.0 ppm. Two earlier investigations permitted 0.5 and 0.5 - 1., respectively.

The principal work of Witheridge and Yaglou, allowing only very low concentrations, 0.04 ppm, was only applicable to continuously *occupied* rooms. The most recent paper—that of Thorpe — permits concentrations far higher than the writer or any of his associates could endure.

NOTE: The author of the article upon Ozone in the "Guide" is apparently ignorant of the great influence of Relative Humidity upon the killing of air-borne infections by ozone. Three investigations in three different countries[2] found that the killing of *air-borne infection* was "nil at low relative humidities, moderate at 50 percent relativity, and very high when the relative humidity approached 100 percent."

(With surface infection the killing may be quite independent of the humidity. If bacteria, mould, etc., are on surfaces, which are not dried out, of meat, cheese, fruit, etc., or on a nutrient in a Petri plate, there will always be high humidity for a distance from the surface. The surface infection is, therefore, associated with sufficient water so that the percentage killing by ozone is quite independent of the relative humidity of the air.)

In the great majority of applications of ozone, the humidity in the air is above 50 percent.

Summary

During the past fourteen years there have been seven important published investigations of the *maximum permissible concentration of ozone.* The writer's appraisal of these reports gives as the permissible ozone concentration for non-continuous occupancy *one part per million of air, by volume.* Killing of air-borne infection by ozone is very dependent upon moderately high Relative Humidity.

[2] Kaess, Chem. Zeits. 62.305, (1938); W. J. Elford & J. Van der Ende, J. Hygiene, London; 42.240-265, (1942); A. W. Ewell, Jo. of Applied Physics, New York, 17, 908-911, (1946).

New Refrigerated Warehouse Directory

THE new 1951-52 Directory of Public Refrigerated Warehouses has just been issued by the National Association of Refrigerated Warehouses. It contains complete listings of the organization, services and facilities of all N.A.R.W. member companies operating throughout the United States, its possessions and foreign countries.

In addition to the United States concerns, it includes refrigerated warehouses in Alaska, Canada, Denmark, Israel, The Netherlands, Sweden and Uruguay. A complete list of N.A.R.W. regional chapters are included and a feature of this edition is listings of the products and services of N.A.R.W. associate members. This directory is published by N.A.R.W. as a service to the members, their customers and associated industries.

Southeastern Chapter Meets

AT A session of the Southeastern Chapter, National Association or Refrigerated Warehouses at the Boston convention, C. A. Martin, Jr., Polar Cold Storage, Inc., Nashville, was elected chairman and C. A. Bowen, Jr., Noel and Company, Inc., Nashville, was elected secretary. Plans were made for an early meeting of the chapter to be held in that area. W. C. Hudlow, Jr., of Chattanooga, is the new Southeastern Chapter representative on N.A.R.W.'s Executive Committee.

Pacific States Warehouse Men Meet in San Francisco

ABOUT 40 cold storage warehousemen attended the National Frozen Food convention held recently at San Francisco. The visitors from the other sections of the country were guests of the Pacific States Cold Storage Warehousemen's Association at a luncheon. The industry activities during the past year were reported by Arthur Otis, New York; J. L. Gagini, Omaha, and Wm. Dalton, Washington, D. C. President Jerry Johnson of N.A.R.W. outlined his program for the current year.

USDA Issues Directory Of Refrigerated Warehouses

A NEW directory of refrigerated storage warehouses has been issued by the Transportation and Warehousing Branch of the Production and Marketing Administration of the United States Department of Agriculture. The list of refrigerated warehouse concerns is quite complete, including all those currently cooperating with the Department of Agriculture in reporting monthly stocks, total piling space and space occupied.

The first directory of this kind was published in 1947 in answer to requests by warehousemen, packers, food processors, distributors and research and statistical agencies. These users have asked for a revised listing since some warehousemen have gone out of business, changed ownership or changed policies of operation, and new concerns have been established. This directory will make readily available to those engaged in the marketing and storage of foodstuffs information as to the available storage facilities in the various localities.

The warehouses listed include public, private, and semiprivate refrigerated plants, apple houses having artificially cooled storage facilities, and meat-packing plants with refrigerated space used for storage purposes. Refrigerated plants are classed as storages artificially cooled to 50 F or lower, wherein foodstuffs are generally stored for 30 days or more. Warehouses operated by wholesalers, jobbers, or retailers who do not store for a period of 30 days or longer are not included in this directory. Also excluded are locker plants in which lockers are 25 cubic feet or less, plants owned or operated by the armed services, and plants operated as part of a retail food business, or of a hotel, or other such establishments where persons are fed, branch distributing houses of meat-packing plants, and those meat-packing plants used solely for cutting, chilling, or working space.

The type of warehousing operation is shown for each plant. Warehouses are arranged alphabetically within cities, and cities are arranged alphabetically within states. Total net piling space and a breakdown of total space as to temperature classifications and type of warehouse are given for each state except where such a breakdown would reveal individual plant data. Warehouse location rather than the mailing addresses of the firm is used if this information is available.

REFRIGERATED CANDY KEEPS BETTER

Studies of refrigeration of candies show that it has decided benefits in retaining quality and making it possible to hold the finished products for longer periods.

J. G. WOODROOF
Georgia Agricultural Experiment Station

ACCORDING to the U. S. Department of Commerce, in 1949, 2,586,200,000 pounds of candy worth $872,000,000 were made in the 48 states by 336 manufacturers. This is a per capita consumption of 17.4 pounds which is about the average for several years.

The Refrigeration Research Foundation, along with the National Confectioner's Association, has been sponsoring research on the storage of candies at the Georgia Experimental Station for two years, as originally announced in an article in the January, 1950 issue of ICE AND REFRIGERATION. The present article is the latest progress report, showing some of the advantages provided by refrigeration.

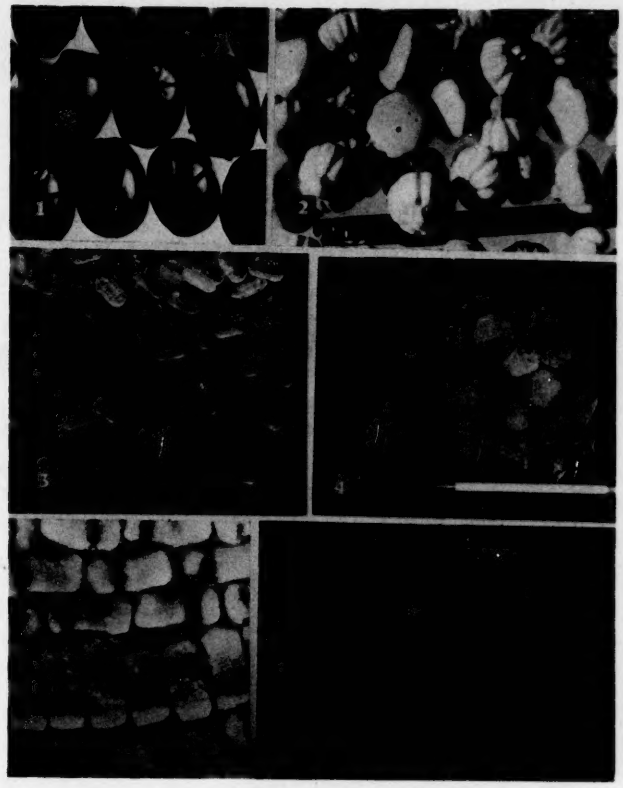
It is significant that the per capita consumption of candies is lowest in the states with the hottest climate and least refrigeration. Mississippi consumes 8.3 pounds per capita, Arkansas 9.5 pounds, Oklahoma 10.3 pounds, Louisiana 10.5 pounds, and Texas 11 pounds as compared with 19.4 pounds in New England and 20 pounds in the North Central states. This is due in part to lack of sufficient refrigeration to adequately store and handle many of our highest quality candies during the summer.

The average price of candy sold in 1950 was 36 cents per pound as compared with 1945 when it was only 24 cents per pound.

It is estimated that the confectionery industry uses 207,012,000 pounds of peanuts, 150,000,000 pounds of dairy products, 7,152,000 pounds of eggs, 41,825,000 pounds of vegetable fats and oils, 48,014,000 pounds of other nut meats and 1,795,867,000 pounds of sugar.

While it is impossible to determine

Presented at annual convention of the National Association of Refrigerated Warehouses.



These candies kept perfectly in refrigerated storage

1—Chocolate covered creams, kept in excellent condition for six months when stored at 50 F and 50 percent relative humidity.

2—Hard creams may be protected against moisture by glazing, but for holding longer than a few weeks the relative humidity should be about 50 percent.

3—Lemon drops are a typical hard candy with low moisture content (.76 percent) requiring 40 percent relative humidity for storage.

4—Gum drops are a high moisture content candy (15.0 percent) that kept best at 63-65 percent relative humidity.

5—Coconut squares contain 7.7 percent moisture and should be stored at 55-60 percent relative humidity.

6—Fudge is a high moisture content candy (10.2 percent) which kept best at 60-65 percent relative humidity.

how much candy is refrigerated along the line from manufacturer to consumer, we do know (a) that there is tremendous potentiality in tonnage and revenue from candy storage, and (b) that a wider variety of more candies would be available during the summer through the use of refrigeration.

Candy People Not Informed On Value of Refrigeration

Popular beliefs in reference to refrigerated storage of candies vary widely. A surprisingly large proportion of candy manufacturers, salesmen, wholesalers, and warehousemen believe that refrigeration, below what is generally considered good air conditioning, is detrimental to candies. The belief has been substantiated by a few observations of poorly packaged candies that were placed in relatively humid cold rooms, and later removed directly to room temperatures and humidities. Within an hour or two, most candies under these conditions would appear moist, sticky, and without finish.

However, experiments conducted at this Station with 18 different types of candies have shown that low temperature storage does not produce these undesirable results if (a) the candy is properly packaged, (b) if the storage room is sufficiently dry, and (c) if the candy is brought to room temperature gradually.

Furthermore, there are several benefits to be derived from refrigerated storage of candies, especially during the summer. These benefits are: (a) insects are rendered inactive at temperatures below 48 F.; (b) staleness and rancidity are reduced as the temperature is reduced; (c) candies can be manufactured the year round and stockpiled for periods of heavy sales such as Easter, Thanksgiving, Mother's Day and Christmas; (d) candies remain firm as an assurance against mashing or sticking to the wrapper; and (e) fading of colors, aroma, and flavors is reduced in proportion to the temperature.

Stored Candies Should Be Well Packaged

Since packaging is the best and often the most practical way to nullify the ill-effects of too-high or too-low relative humidity, candies should be placed in packages which are as nearly moisture-proof as practical. Good packaging not only prevents easy loss or pick-up of moisture by individual cartons, but affords a barrier to the transfer of moisture from one kind of candy to another within the package.

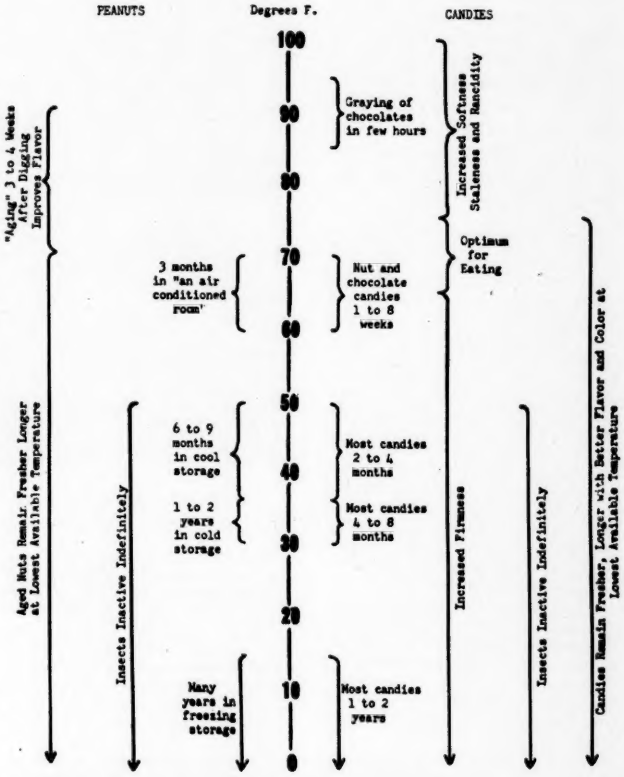
"Assorted" candies may prove especially troublesome if the dozen or more kinds in a box are of different moisture contents. However, since assorted chocolate covered nuts, hard candies, milk chocolate, bitter chocolates, and pressed waifers all contain less than one percent moisture, they may be satisfactorily packaged together and stored.

Another group of candies which may be packaged together are nougat bars, chocolate covered nougat centers, hard creams, sugar bon bons, and most coconut candies, all of which contain from 5.5 to 7.7 percent moisture. High moisture candies such as marshmallows (16 percent), fudge (10.2 percent), gum drops (15.1 percent), plain caramels (9.1 percent), and soft creams (8.2 percent) should be packaged separate from low moisture content candies. If candies of widely different moisture contents must be packaged together, transfer of moisture from one to another may be minimized by wrapping some of them in aluminum foil, as is frequently done.

The highly competitive market and the expected quick turn-over for candies is a deterrent to good packaging. Since most candies are imperfectly packaged, attention must be given to the environment in the storage room.

Some Candies Are More Stable Than Others

The shelf life of a particular kind of candy is determined by the stability of its individual ingredients. Common candy ingredients are sugars, including sucrose, dextrose,



Above chart shows critical temperatures in storage of peanuts and candies.

★ PERFECTION ★

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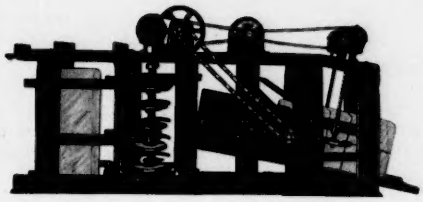

A scorer should do more than merely score ice . . . .

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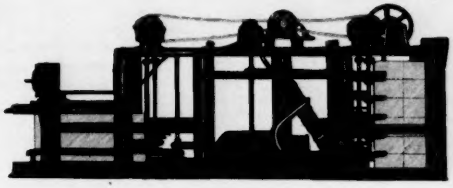
Receives ice block standing on end, scores it, and delivers on edge. Capacity 6 blocks per minute. Reduce labor, increase profits.



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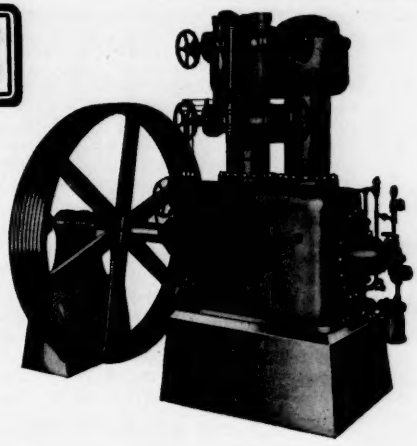

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corn syrups, and invert syrup; dark and milk chocolates; nuts, including coconut, peanuts, pecans, almonds, walnuts, and others; fruits, including cherries, dates, raisins, figs, apricots, and strawberries; and dried milk, dried eggs, cream of tartar, milk, cream, butter, gelatin, soy bean flour, wheat flour, starch, and artificial colors.

Storage of confections begins with the storage of the ingredients from which the candies are made. Especially is this true with ingredients containing fats (such as nuts) and delicate flavors and colors, as is true with certain fruits; as well as with ingredients containing proteins, such as milk, eggs, flour, and gelatin. These ingredients, unless properly stored from the time of harvesting, may be used in confections after certain degradation processes are well under way.

Humidity Must Be Low

Candies must be stored in dry rooms irrespective of the temperature. Unfortunately, refrigerated storage has become associated with dampness, and it is more difficult to maintain dry cold rooms than dry warm rooms.

The desirable relative humidity for candy storage depends upon the moisture content of the candy. Marshmallows, gum drops and fudge have more than 10 percent moisture, and to avoid stickiness on one hand and becoming hard and brittle on the other, the relative humidity in refrigerated storage should be from 60 to 65 percent. Candies with a moisture content from 6 to 10 percent, as caramels, soft creams, chocolate covered creams, taffy kisses, sugar bon bons, and nougat bars, require a relative humidity from 55 to 60 percent.

Nut rolls and many five-and-ten-cent bars as well as most of the fine boxed chocolate candies have a moisture content of about five percent, and should be stored at 50 percent relative humidity; while candies with moisture content of about one percent, as hard candies, milk chocolates, semi-sweet chocolates and nut brittle should be stored at 40 to 50 percent relative humidity.

Low Temperature Desirable

These experiments show that the lower the temperature, the more completely fresh candy will remain. The selection of the most practical storage temperature depends upon the ends sought. If it is desired only to keep the candy firm during the summer weeks, 65 F would be low enough; if it is desired to prevent insect infestation and rapid staleness, the temperature should be below 50 F; if freshness is to be maintained and rancidity avoided for a month or more, it should be stored at 30 to 34 F; if the candy is being stockpiled for several months, 0 F storage would be most dependable.

For most candies under most conditions a "40-50 formula" (40 F. at 50 percent r.h.) will yield highly satisfactory results for storage.

Many candies contain fats either as added butter, nuts, dried eggs, or dried milk. If exposed to outside odors the fat portion of candies readily absorbs them as off-flavors. For this reason the air in storage rooms must be kept free of storage odors of all kinds. This may be done by recirculating the air through carbon filters, by constantly bringing in fresh outside air, or by the use of ozone or other air purifiers.

Tempering on Removal From Refrigerated Storage

Since candies are mostly sugars and only a very small amount of moisture is required to render them sticky and destroy the surface finish, condensed moisture on the surface may do much harm. This must be avoided by "tempering" the candies on removal from storage, that is, they must be removed to a room with 10 to 20 F higher temperature for about 12 hours before bringing them into the open warehouse. Obviously, the lower the storage temperature the longer the time and the more steps required for satisfactory tempering.

Summary

There is a specific environment of temperature, relative humidity, and odor-free air, at which candies can best be held. These conditions can be maintained best by segregating the commodities in storage as much as possible, and by arranging the packages so that desirable channels are formed for air circulation. Under these conditions most candies can be stockpiled for periods ranging from three to twelve months or even longer.

January Holdings Frozen Fruits and Vegetables

COVERAGE of frozen peaches, raspberries, and strawberries as a whole remained high with 78 percent of total stocks of these items classified according to package size on January 31. This was only 1 point below record coverages of selected fruit holdings reached on June 30, 1948 and August 31, 1950 when 79 percent of stocks were classified.

Individually, the proportions of peach, raspberry, and strawberry stocks in retail packages have remained about the same since August 31, 1950, with approximately one-fourth of the peaches and raspberries and slightly more than two-fifths of the strawberries in this type container.

FROZEN FRUITS AND VEGETABLES IN PACKAGES OF ONE POUND OR LESS IN STORAGE JAN. 31 AND DEC. 31
(000 LBS.)

	Jan. 31 1951		Dec. 31 1950	
	lbs.	pct.	lbs.	pct.
Peaches	2,723	24	3,040	24
Raspberries	5,459	26	5,821	25
Strawberries	28,577	42	31,427	41
Asparagus	3,918	77	4,190	71
Beans, lima	22,062	63	26,457	64
Beans, snap	16,049	69	21,075	69
Corn, sweet	11,866	56	13,431	52
Peas, green	37,657	66	47,448	65
Spinach	7,225	75	9,410	77

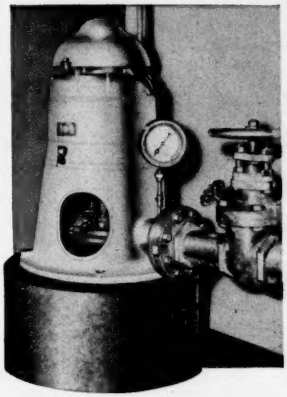
A year ago this time retail packages of peaches comprised two-fifths of the stocks classified, while raspberries in consumer packages amounted to one-fifth of classified stocks. About the same proportion of strawberry stocks were in retail packages a year ago as there were on January 31 of this year.

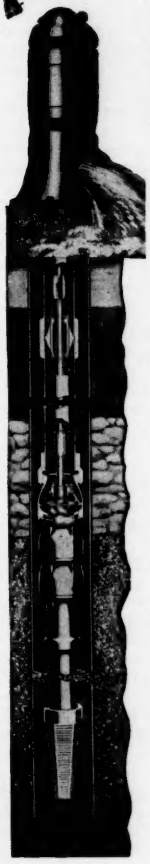
Frozen Vegetables

Sixty-two percent of the 246 million pounds of selected frozen vegetables in storage January 31 were classified as to container size. This was 3 points below last month's coverage but equals average coverage for the past year.

The distribution by package size of frozen asparagus showed the greatest change during January. At the end of the month 77 percent of asparagus stocks were reported to be in consumer packages in comparison to 71 percent reported on December 31. Sweet corn showed a 4 point increase, percentagewise, in the portion of stocks in retail containers and peas a 1 point increase during January.

The ratio of retail to institutional-sized containers remained the same for snap beans, while classified stocks of lima beans and spinach in the smaller containers decreased 1 and 2 points, respectively.





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Illustrated above is a Deming Deep Well Turbine Pump rated at 50 gallons per minute at 315 foot head. Motor is 7½ H.P.

This pump is the "water works" of a plant in your industry. Money saved by this Deming Turbine Pump compared with the former cost of water contributes to the profitable operation of the plant.

Deming Deep Well Turbine Pumps are manufactured in a wide range of standard sizes for wells 4 to 16 inches or larger in a complete range of capacities from 15 to more than 3500 gallons per minute.

BULLETIN 4700 contains 24 pages of information and illustrations about Deming Deep Well Turbine Pumps. A copy will be sent to you promptly upon request. Write:

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DEPENDABLE PUMPS

You can't count on the weather

So order Armour's Anhydrous Ammonia now!

Warm weather has a way of creeping up and catching you off guard. You just can't count on seasons changing according to calendar dates.

But you can count on Armour's Anhydrous Ammonia Service—it's real insurance against a sudden jump in temperature.

Armour's Ammonia is pure and dry, free of moisture and non-condensable gases and, to insure trouble-free operations, every cylinder is tested and checked before shipping to give positive assurance of fine quality.

Armour's 65 conveniently located stock points assure you prompt delivery of anhydrous ammonia where you want it—when you want it—and fast. Place your order today and you'll be ready for any sudden change in the weather.

Available in 50, 100 or 150 pound cylinders.

You can depend on Armour's Ammonia and Service

ARMOUR *Ammonia Division*

Armour and Company, 1355 W. 31st St., Chicago 9, Ill.

Preventing Fire Losses

(Continued from page 20)

guish the flames with the foam, dry chemical or carbon dioxide extinguishers.

It is this first-hand experience that very possibly will be the difference between a very serious fire and one which, "could have been" but wasn't.

Several months ago we had a fire break out because of a short on the rotor of a 450 hp synchronous motor. The engineer on duty saw the flames. First he cut the power then grabbed a carbon dioxide extinguisher and extinguished the flames. What could have resulted in a major disaster was confined to minor damage to the rotor. That one incident alone will justify the time and effort spent in our annual fire prevention demonstrations for many years.

Good Housekeeping

Good housekeeping is another very important feature of all good fire prevention programs. If we keep an all around clean plant, fires will not have an easy time in spreading from little ignition points into major conflagration. Store materials properly and don't allow areas of rubbish accumulation to exist.

Also wherever possible, our engine rooms should have high ceilings and good ventilation features. These are especially important when a serious ammonia leak occurs. They will help prevent the ammonia concentration from reaching the inflammable and explosive range of 16 to 27 per cent by volume.

Exposure to Fire

In conclusion, it is most important that we recognize the exposure confronting our refrigerating plants to the destruction from fire. We are not immune to the more prevalent industrial causes of fire such as electricity, friction, or open flames. In fact, we are many times confronted with hazardous complication involving the refrigerant that make our plants even more vulnerable to fire damage.

First, we should know and recognize these causes of fires and, secondly, we should have the "know-how" in using the hand fire protective equipment that is supplied in our plants. Fire protective demonstrations should be held at least once a year to facilitate the proper instruction in the use of the equipment. All fires start small, and proper use and application of such equipment will keep them that way!

Preventing Accidents

(Continued from page 23)

ber. The vehicle of power is salesmanship. The plant safety program will work out best when it is established on this basis.

There is a perfect analogy between getting efficient production and preventing accidents. Getting employees to work safely, such as wearing their safety goggles or face shields, is done in the same manner as getting the employee to turn out quality and quantity of goods, etc. The shop foreman tells the employees to get the work out and he can at the same time use the same stuff and get the work done in a safe way.

Summary

If there is the will to achieve, if true accident causes are known, and if remedies are effectively applied, there can be no question of results.

There is no difference between the methods or procedure of obtaining efficient production and in the prevention of accidents.

Modern Handling Equipment

(Continued from page 54)

handling hand lift trucks are used for horizontal movement. Orders are built up in uniform pallet loads on the shipping floor, with the result there has been a great saving of time, effort and space. On the warehouse floor the pallets are loaded on the elevators by the battery-electric fork trucks, while at the first-floor truck loading dock, the pallet hand lift truck moves the loads from elevator to truck-side or, in the case of large orders, the pallet is handled directly into the truck.

During the ten years since The Borden Company has made use of battery-electric fork trucks and pallets in the handling of merchandise, methods have been devised so that approximately 80 per cent more goods are handled in the present warehouse, "and with considerably less man-hours," Mr. Maus said, than in a previous operation.

The "heavy duty" fork trucks used by The Borden Company each have a capacity of 2,000-lb., and each is capable of tiering a pallet load to an extreme height of 144-in. Spare storage batteries are maintained for each truck so that there is virtually no interruption of operations at any time due to lack of power. The only "down time" recorded is approximately 10 minutes for a change of battery. A preventive maintenance program of checking, greasing and servicing the trucks has been setup, together with a thorough battery checking and cleaning operation. Maintenance costs have been "ordinary" according to Mr. Maus who said that they were so low that it was not felt necessary to maintain special records on them.

Trucks are operated by The Borden Company a full eight hours a day on a five-day week. There is some seasonal activity that, at times, accounts for longer use, but this is the exception rather than the rule, since all operations of receiving and shipping can be performed within an ordinary day.

Two sizes of pallets are used by The Borden Company in the St. John's Park Freight Terminal warehouse. Both the Grocery Products and Cheese Divisions use the 37 x 43 in. pallet. However, for handling barrels and bags, Grocery Products uses the 48 x 48 in. size. Pallets are two-way, double-faced, and are made of wood.

A.S.R.E. Spring Meeting In Detroit May 27-30

THE Spring meeting of the American Society of Refrigerating Engineers will be held at Detroit, Mich., May 27-30, 1951. The Hotel Statler will be headquarters for the meeting. Technical sessions and social events will be held in the hotel and inspection tours have been arranged in the city and environs.

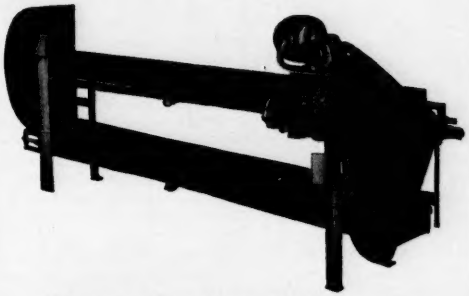
Leon Buehler, Jr., and members of the program committee are arranging a technical program of unusual merit. Sessions will be held each morning plus the domestic refrigerator engineering conference. The entertainment program will start with the President's reception Sunday evening, followed by the welcome luncheon Monday and party Monday night, and the dinner dance Tuesday evening.

The principal inspection trip will be a conducted tour Tuesday afternoon through the River Rouge plant of the Ford Motor Company with special attention to the important role refrigeration plays in modern industry. Members of the Detroit section will act as hosts for the meeting. In charge of all arrangements is the executive committee made up of Edward Kellie, G. H. Poggen, and the officers of the section and chairman of the special meeting committees.

Special activities are planned for the ladies during the periods when technical meetings are in session.

Install A Polar Vendor NOW for
EXTRA ICE SALES ... EXTRA PROFITS

You too can increase your sales and profits—AUTOMATICALLY — by installing a Polar vendor in your storage room or vault.
The Polar vendor operates 24 hours a day, every day of the year, making cash ice sales for you. Your customers will like this quick and convenient method of purchasing ice at your dock whenever they want it.
The dependable Polar vendor is equipped with delivery chute, outer vendor door and frame, multiple coin unit, automatic counter and a trap door. Constructed of the finest materials available on the market, the Polar vendor will give years of trouble-free service. Choose from seven standard sizes with one, two, three or four belts.



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Merchandise Ice The Polar Way
VEND CAKES OR BAGS OF ICE AUTOMATICALLY
24 HOURS A DAY—EVERY DAY OF THE YEAR

Refrigeration Engineering Company

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- *SAFE*
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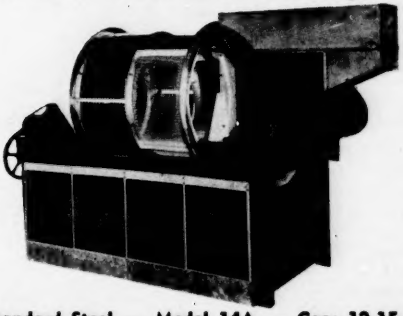

for the . . . progressive— profit-wise Ice Man

Stainless or Standard Steel — Model 14A — Cap: 12-15 Tons Per Hour

This new Model 14A Lilly ICIZER is the ideal Sizer for low headroom vaults. Only 71½" high overall. Will produce a size of ice suitable for every need. Rugged frame constructed of heavy channel and angle steel—heavy galvanized screens and floor bins—assure long life—trouble-free operation. Can be furnished with either standard steel Breaker housing, or stainless steel, at small additional cost. The new slow speed Breaker, together with the easily operated hand lever adjustment add up to better control of sizes produced—*more saleable ice.*
Other models, with "B" type bagging bins and "CE" model with elevator and bagging bins can be furnished with capacities up to 35 tons per hour. Write or wire today for complete information and prices on Lilly ICIZERS.

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Capacities from 10-35 tons/hr.
Write for Crusher Catalog

THE LILLY COMPANY
466 Union Avenue, Memphis 1, Tenn.

Ice Tools
Ice Supplies
Plant Equipment

Black Spot on Shrimp

(Continued from page 50)

then sealing should be effective.

Another scheme which suggests itself is to treat shrimp with substances which have a greater liking for air than the substance which becomes black. In our laboratory dipping shrimp in a 1 per cent solution of either sodium bisulfite or sodium sulfite has been found effective. Neither of these substances are rated as poisonous and Food and Drug officials with whom I have conferred were of the opinion no objection would be raised if it were shown that no sulfite remained in the cooked product. Since the shrimp, in ordinary practice, would be washed, cooked and then peeled I believe it will be shown no residue remains.

Finally I wish to indicate one reason why black spot is a problem. Last May I spent several days at the shrimp fishing grounds off Pass a Lutre, which is about 10 hours by boat southwest of Biloxi, Miss. The practice in this area is to store the shrimp in baskets on the deck from the time they are caught until the boats return to the Pass for the night when the catch is transferred to a freight boat for icing and storing. Such treatment is not only conducive to black spot development but also to rapid spoilage of the shrimp.

Having told you the story of black spot I shall digress for a few moments and point out that these results were obtained after three years or so of hard work, and I might add at times of discouragement. Through it all Director Diehl never lost confidence in our ability to cope with the problem, and his encouragement and enthusiasm have been most helpful. To him and to The Refrigeration Research Foundation the staff of the Department who participated in our shrimp research join me in expressing our gratitude and thanks for making this work possible. I wish also at this time to compliment the Foundation on supporting research which is basically theoretical, but as we have seen in this case does have some practical implications.

Locker Plant Space

LOCKER plants now in operation have an estimated 80 million cubic feet of storage space for perishable foods according to a survey by the Farm Credit Administration of the U. S. Dept. of Agriculture. This space amounts to about half the commercial sharp freeze storage space in the United States.

Chicago Section A.S.R.E.

AT THE March dinner meeting of the Chicago Section, American Society of Refrigerating Engineers, Sam Lewis adequately covered his role as a consulting engineer. He preceded his discussion in his characteristic analytical fashion by first defining his type of consulting work as one who serves as an independent advisor to the individual consumer and the architect in a manner so as to provide adequate construction for electric power, illumination, plumbing, heating, ventilating and automatic temperature control into successful operation of the structure and for good maintenance of the equipment.

The heat pump principle and radiant heating systems were covered. The promotion of human comfort, he said, could be best obtained by balancing the heat transfer load across ceilings, walls and floors with a built in source of heat provided by warm water coils, warm electric wires or warm air passages to compensate for this heat exchange. This design, he said, would also be of value in summer cooling since large quantities of cold air at too cold a temperature for human comfort would not be required.

Discussion was also given to the solution of problems encountered by stratified air in Art Galleries, an underground railroad station, and the houses of congress.

There are precautions to be taken in the design of successful forced air circulation systems. The filtering of air is being improved, but perfection in dust removal is still not possible and this is one part of the business that receives the most complaints. For example the space between a suspended ceiling and the structural ceiling should not be used to distribute air without means of cleaning. Also duct systems should be accessable for cleaning. Another example is that exhaust fans are necessary in exhausting a part of the air in the return air supply system, for systems built with a supply fan only seldom perform under all conditions as desired.

Zoned heating works out most satisfactorily in systems having large rooms or departments that have different cooling or heating requirements. The recently completed 14 story S. C. Johnson Company Chemical Research Tower of "Sams" design has been laid out with 28 different heating zones each of which has its own hot water reheater and it has been operating very successfully.

Book Review

REFRIGERATING DATA BOOK, APPLICATIONS VOLUME (3rd edition), edited by D. C. McCoy; published by American Society of Refrigerating Engineers, 40 W. 40 St., New York 18, N.Y.; 1951; 1080 pages; Price $6.00. For sale by Nickerson & Collins Co., Chicago.

The second revision of the Refrigerating Data Book, Applications Volume, first published in 1940 and revised in 1946, has just been issued as the 1950 edition by the American Society of Refrigerating Engineers. All chapters have been reviewed, revised, and brought up to date by 81 authors, all recognized experts in their different fields. Several chapters have been completely rewritten to conform with the latest practice in refrigeration applications. In addition the volume has been expanded to include five new chapters on subjects which have become of vital concern to the industry since 1946. These new chapters are: Packaging of Frozen Foods, Frozen Fruit Juice Concentrates, Storage of Dehydrated Fruits and Vegetables, Refrigeration of Fruits on Railroad Diners, and Metals for Use at Low Temperatures.

Particularly significant is the chapter on frozen juice concentrates which describes authoritatively for the first time in any refrigeration handbook the various methods of obtaining fruit juice concentrates, the equipment required, and the operating procedures.

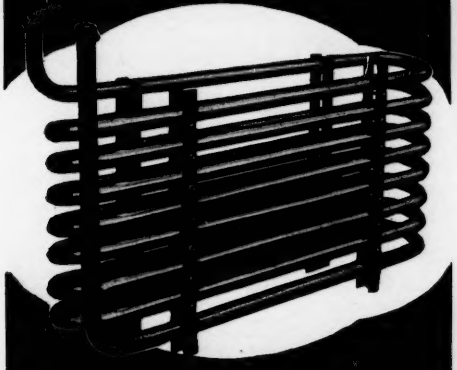
Extensive bibliographies are found throughout the book, providing sources of additional information for those interested in delving further into particular subjects. For locating subject matter in the book more easily, the index has been enlarged to include more headings, subheadings, and cross references.

The refrigeration industry's most complete Refrigeration Classified Directory will provide ready references for those seeking lists of suppliers and manufacturers of equipmnet, component parts, and materials. Every effort has been made to insure accuracy and completeness in this section as a service to readers.

Under direction of Editor-in-Chief Dan C. McCoy of Frigidaire and eight associate editors, the eight major sections of the book provide the latest information anywhere on the applications of refrigeration. These sections are: Frozen Foods, Cold Storage Practice, Refrigeration in Food Manufacture Refrigerated Food Distribution, Low Temperature Applications, Industrial Applications, Comfort Air Conditioning, and Industrial Air Conditioning.

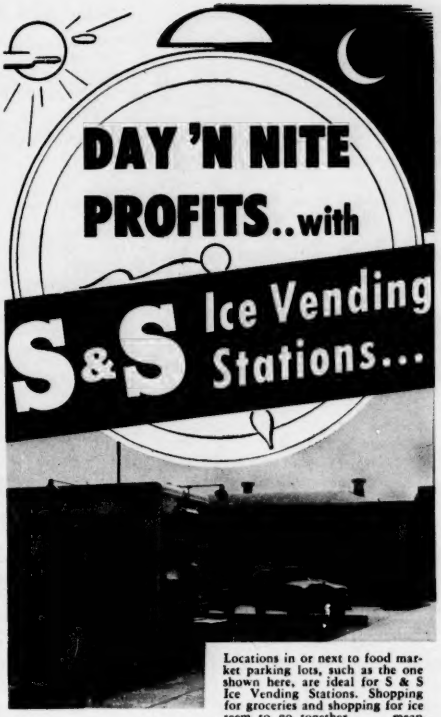
Coils

Smooth Bends
Perfect Welds
Exact Measurements



For over sixty years, the National Pipe Bending Coils have proved their quality in Ice and Refrigeration plants

DAY 'N NITE PROFITS..with S&S Ice Vending Stations...



Locations in or next to food market parking lots, such as the one shown here, are ideal for S & S Ice Vending Stations. Shopping for groceries and shopping for ice seem to go together . . . mean more ice sales for the wide-awake ice distributor with an eye out for extra profits around the clock.

Wide-awake ice merchants are making extra ice profits "after hours" with S & S Ice Vending Stations. Round-the-clock service wins new friends for manufactured ice, holds old customers, cuts costs and puts unprofitable routes on a paying basis. S & S Vending Stations increase your volume of block or crushed ice and at the same time lower your cost of operation.

Be sure the ice venders you install are S & S, for over 20 years the leader. Dependable, profitable, economical-to-operate S & S Ice Vending Stations are delivered complete and ready to plug in and go to work for you while you sleep.

Write for complete information on S & S Ice Vending Stations . . . or Venders for your own refrigerated storeroom, to gather in those "after hours" sales!

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Regional Office: 1011 N. Highland St., Arlington, Va.
Home Office: 670 Lincoln Ave., San Jose, California
Branch Office: 702 No. Sixth Street, Vincennes, Ind.

Mechanical Refrigerator Sales Show Increase

MORE household mechanical refrigerators were sold during 1950 than any previous year according to figures released by the National Electrical Manufacturers' Association. During the year 5,848-579 units were sold by 16 manufacturers reporting to the association.

Including sales by other manufacturers, not members of the association, and gas refrigerators, the total figure probably came close to 7 million units. The most popular sizes were 8 and 9 cubic foot models. Sales of 6 ft and smaller models were negligible. A total of 5,637,108 units were sold in the United States, 10,493 in Canada and 200,978 in foreign markets.

Another record was established by the sale of farm and home freezers. The 27 manufacturers reporting sold 645,151 units, all but 5,799 in the United States.

Mild Winter Curtails Ice Harvest in Nova Scotia

NOT a ton of ice was harvested this winter off the east-coast shore-fishing town of Canso, Nova Scotia, whose inhabitants are worried because lack of ice would curtail operations of the local fish industry. Mild weather is the cause of the ice famine, which forced fishery officials and the town Board of Trade to hold a conference. They decided to write J. R. Kirk, Federal Member for constituency asking him to bring the situation to the attention of the Department of Fisheries. It is hoped a subsidy can be obtained for the importation of ice.

CONVENTION CALENDAR

EASTERN STATES ICE ASSOCIATION
April 3, 1951
Warwick Hotel, Philadelphia, Pa.
SAMUEL FREER, Secy.-treas.

NEW ENGLAND ICE ASSOCIATION
April 11-12, 1951
Sheraton-Biltmore Hotel,
Providence, R. I.
RAY T. WILBER, Exec. Secy.

A.S.R.E. SPRING MEETING
May 27-30, 1951
Hotel Statler, Detroit, Mich.
M. C. TURPIN, Secretary

Sales and Reorganizations

Douglas, Ga.—Corbett & Morris of Pearson, Ga., have taken over operation of the Clough Ice Co. plant here which they purchased recently.

Sparta, Ga.—The Sparta Ice Co., owned and operated for the past several years by G. W. Dobbs of Thomson, was sold at public auction here recently.

Meredith, N. H.—The Colby Ice Company has been sold to Philip Knowles, owner of the Plymouth Ice Co., Plymouth, who intends to continue the business as formerly conducted.

Cincinnati, Ohio—The Cincinnati Ice Manufacturing & Cold Storage Co. has sold its ice business to the City Products Corp. and Schoenling Brewing Co., according to an announcement by F. S. Krug, Jr., president and general manager of the Cincinnati firm.

Beaumont, Tex.—Carroll E. Ward, president and general manager of the Texas Ice Company recently announced sale of his interest in the firm to his brother, H. L. Ward, the firm's vice-president.

From Frying Pan to Freezing

IN THE extensive testing that goes on in the laboratories of paint and finishes manufacturers to perfect their products, changes of temperature are carefully considered. To determine the reaction of a coating to sudden temperature changes, for example, a test panel may be placed in a hot oven, to simulate the extremes of tropical heat, then shocked with the frigid chill of sub zero temperatures in a refrigerator.

ASSOCIATION DIRECTORY

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Raymond Wilber, Secretary
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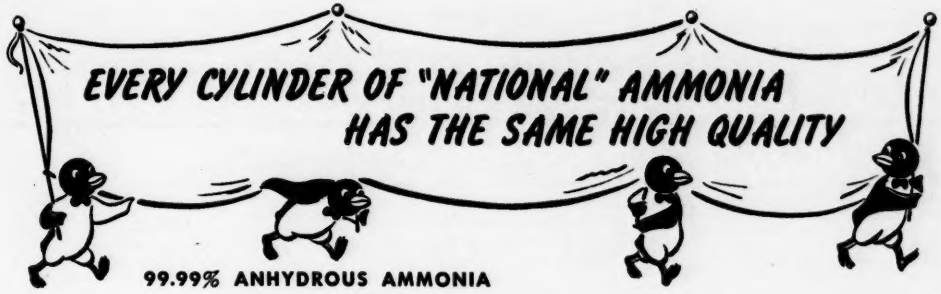

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The Finest in Ice Making Machines, Air Agitation Systems, Parts and Supplies

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NEW PLANTS and IMPROVEMENTS

This Department each month presents the more important developments covering new constructions, as well as additions, improvements, remodeling, and installations of new equipment in ice and cold storage plants and other industrial plants that use refrigeration. News notes on all such new constructions and improvements are invited.

California

Dinuba, Calif.—A new cold storage facility and turkey processing plant estimated to cost one million dollars is being put under construction here. The company with headquarters in San Francisco, has signed a 99-year lease for the Dinuba site.

Florida

Jacksonville, Fla.—The Patterson Cold Storage deep freeze warehouse at 2481 Dennis Street is being more than doubled in size by construction of a new wing containing 30,000 square feet of storage space, it was announced recently. The first unit was opened February 7, 1950, as a transit storage point for frozen foods and citrus products awaiting shipment to northern and Midwestern markets. The first wing contained 24,000 square feet of storage space, giving a capacity of about 10,000,000 pounds of frozen foods. Announcement of the erection of the first unit was made in the October 1949 issue of ICE AND REFRIGERATION. Value of the new construction work was not disclosed, although it was estimated in excess of $100,000.

Pensacola, Fla.—The People's Ice Company recently installed another "Sturdy-Built" ice vending station equipped with four ice vending machines. George Yarbrough, Jr., offers his customers 25 lb block, 50 lb block, crushed ice, and cubes, all from the same station.

Indiana

Evansville, Ind.—Ice Service, Inc., which already has ten "Sturdy-Built" ice vending stations, has just installed another at one of their main locations.

Peru, Ind.—Glen Alspaugh of the Abso-Pure Ice Company reports the installation at their platform of a "Sturdy-Built" block ice vendor.

Michigan

Grand Rapids, Mich. — Borden Dairy & Ice Cream Co. will construct a $75,000 addition to the firm's plant at 217 Eugene St. S.E., according to M. W. Stechow, local manager. Work on the addition will start immediately and the building is expected to be completed this spring.

Missouri

Shelbina, Mo. — The Missouri Ice Company is now offering 50 lb block ice from their recently installed "Sturdy-Built" ice vending machine.

New Jersey

Jersey City, N. J.—Hudson Refrigerating co., has added a Worthington 16¾x9½x12 DC2, 200 hp horizontal ammonia compressor and one Worthington 5L1 pump. The new system cools calcium chloride brine which in turn cools frozen food storage rooms.

New York

Auburn, N. Y.—The Eldredge Coal & Ice Company has added a "Sturdy-Built" ice vending machine to the "Sturdy-Built" refrigerated ice vending station which was purchased last year.

Buffalo, N. Y.—N. Kotok Fish Company has applied to the Zoning Board of Appeals here for permission to enlarge and use the premises at 312-314 Sycamore St., for storage, freezing and shipping of fish. The company plans to erect a $50,000 one-story building on the premises.

Oregon

Ontario, Ore.—The Oregon Frozen Food Company which last year leased the former Bridgford plant here has announced that it intends to enlarge its operation during 1951.

Parkdale, Ore.—The Apple Growers Association cold storage plant here is to be enlarged, increasing the facilities by 180,000 boxes.

Weston, Ore.—Lamb-Weston, Inc. has started building a new storage facility that will double the size of the present operation. Cost of construction will be about $200,000. Work was started January 10 and was to be finished by May 15. The new building will be concrete and tile construction and two-thirds will be a subzero freezing plant.

Tennessee

Dyersburg, Tenn. — Food Sales Company, Chicago, has taken a five year lease on the canning freezing plant here, owned by C. C. Calcutt. The freezing capacity of the plant is being doubled, and a new holding room is to be built; a new processing room now under construction will be completed in time for the strawberry season.

Texas

Levelland, Tex. — The Levelland Ice Company reports installation of a Sturdy-Built block ice vending machine for their platform trade.

Washington

Seattle, Wash.—George A. Hormel Company's new plant at 1220 Sixth Ave. South was officially opened January 21. The new plant, of concrete-and-mill construction, is equipped with the latest-type lighting, ventilating and refrigeration systems.

Fires and Accidents

Montreal, Que., Canada — The warehouse of Trans-Allied Refrigeration here was recently destroyed by fire. Chemicals in the building made it difficult for firemen to control the blazing structure.

Live Oak, Fla.—The Sessions Cold Storage Company plant suffered severe fire loss recently when the smoke house which is adjacent to the main building was burned completely to the ground. About 4,000 pounds of meat was destroyed.

Danville, Ill.—The office and warehouse of the Crystal Ice & Fuel Co. was damaged in a fire recently.

Kingston, N. Y.—The new cold storage plant of Theodore Wright on Route 208 between Ireland Corners and Gardiner was completely destroyed by fire recently. The plant had a capacity of 20,000 bushels of apples. The loss is estimated at between $35,000 to $40,000.

Nyssa, Ore.—The Polar Cold Storage and Locker plant, owned by Mr. and Mrs. Lloyd T. Marshall, was destroyed by fire, estimated loss of which was $100,000. The plant was only partially covered by insurance and Mr. Marshall said that he had no intention of rebuilding the plant. The net loss to the owners was somewhere near $90,000.

Walterboro, S. C.—Fire of undetermined origin destroyed the ice plant of the Coastal Public Service Company on Marrall Street recently with a loss estimated at about $75,000.

Houston, Tex.—Fire occurred in Lee's Ice House and Trading Post, 6300 Jensen Drive, causing an estimated $20,000 damage.

Icy Items

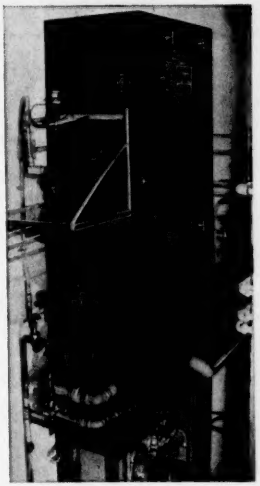
Cotton Plant, Ark. — The Cotton Plant Ice Company has gone out of business. Former owner and operator was F. B. Schoephoester.

Hutchinson, Kans.—The Gardner Ice Co., here, has gone out of business. Mr. Gardner's ill health and his son's entrance into the Army is the reason given.

Lake Charles, La.—The Pure Ice Company, Inc., has been granted dissolution of its charter of incorporation, the secretary of state announced recently.

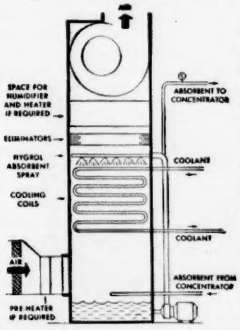
New "Controlled Humidity" Method Gives a Better Solution to Air Conditioning Problems

"Hygrol"
Absorbent
Liquid
Dehumidifies
Fresh Air
Without
Refrigeration



● NIAGARA Air Conditioners or Dehumidifiers using "Hygrol" liquid absorbent give precise control of air temperature and humidity . . . at lower operating cost, with large savings in space and with smaller and less expensive equipment, in many applications.

This method dehumidifies the air by passing it through a chamber in which "Hygrol" spray removes its moisture and produces a low dew point. The "Hygrol" solution resulting is continuously and automatically re-concentrated, providing always full capacity in air conditioning and assuring always a constant dehumidifying capacity and a trustworthy, constant condition for your material, apparatus, process or room to be conditioned.



NIAGARA CONTROLLED HUMIDITY METHOD — FLOW DIAGRAM

"Hygrol" is a liquid, not a salt solution; it stays pure and non-corrosive; does not cause maintenance or operating troubles in food plants or in chemical processes.

Investigate this new Method for "comfort" air conditioning as well as to protect quality in hygroscopic material, or processes or instruments, or to prevent condensation damage to metals, parts or products.

Write for Bulletin No. 112

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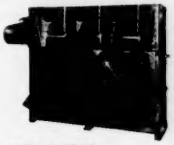
Ammonia condensers

1. Exclusive lock-nut construction available for quick and easy tube replacement.
2. A.S.M.E. construction and certification.
3. "Tailor-made" to specifications.
4. Dependable, versatile and economical.
5. Full range of models, types and sizes.

Blow-cold* industrial unit coolers



1. Hot-dip galvanized AFTER fabrication.
2. Vertical or horizontal discharge.
3. Easy accessibility to coils.
4. Separable fan section.
5. Large inspection doors.
6. Air duct front or back.
7. Use with Freon 12 or Ammonia.

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Evaporative condensers

1. For Freon or Ammonia.
2. Capacities from 120,000 to 1,250,000 Btu/hr.
3. Flexible fan section.
4. Hot-dip galvanized AFTER fabrication.
5. Available with internally mounted receivers, including piping.
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You can depend on ACME'S fine workmanship. ACME'S long experience and practical knowledge are yours for the asking. Let ACME Engineers help you solve your unusual heat transfer problems. *Write for information or for catalog on equipment in which you are interested.*

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Jackson, Michigan

DEATHS

John C. Muckerman

THE death of John C. Muckerman, St. Louis, Mo., one of the founders of the Polar Wave Ice & Fuel Co., predecessor of the City Products Corp., occurred from infirmities of age March 4.

Mr. Muckerman, who was 82 years old, became associated with his father, the late Christopher Muckerman, in operation of the old Muckerman Ice and Coal Co., in 1884. He was vice president of the Polar Wave Ice and Fuel Co. from the time of its incorporation in 1904 until 1920, when he became president, serving in that capacity until the company merged with City Ice & Fuel (City Products Corp.) in 1926. He was a member of the board of directors of City Ice & Fuel Co. for a number of years, retiring in 1937.

Surviving are his widow, Mrs. Pauline Muckerman; three sons, Walter B. Muckerman, Clayton; Chris J. Muckerman, Webster Groves, and Francis X. Muckerman, Kirkwood; and four daughters, Mrs. Rose M. Ezzell of San Antonio, Tex.; Mrs. Ruth M. Hurley, Clayton, Mrs. Alice M. Krause and Mrs. Gladys M. Rowling, Ladue.

Charles R. Jones

THE death of Charles R. Jones, an ice manufacturer in Dallas, Tex., for fifty years, occurred February 20 in a Dallas hospital. He was 81 years old.

Mr. Jones was born in Aberdeen, Miss., and came to Dallas County with his parents in 1886. He entered the ice business in 1901 and at intervals had been connected with virtually all the ice plants in Dallas in some executive capacity.

At the time of his retirement several years ago he was president of the Pure Ice & Cold Storage Co., and had interests in other ice concerns in the state. He was a director of the Dallas Power & Light Co. for many years and nine years ago received a plaque in recognition of his quarter of a century membership on the board.

For the past several years he had devoted time to his hobby, raising flowers. An enthusiastic sportsman, he had been a member of the Fin and Feather club for more than fifty years and was its president for 25 years. He was a member of the Edgefield Church of Christ and was active in its recent building campaign.

He is survived by his widow and two daughters, Mrs. Will E. Cox and Mrs. Lester Grugett.

George Valentine

THE death of George Valentine, assistant sales manager, Ice Division, City Products Corp., Chicago, occurred suddenly Wednesday afternoon, March 14. Mr. Valentine was attending a meeting of the Chicago District Ice Association at the Bismark Hotel, was stricken with a heart attack while there and died almost immediately.

Mr. Valentine was well known in ice circles in Illinois and was very helpful in organizing and carrying on the activities of the Illinois Ice Merchandising Council and other merchandising work. His knowledge of ice and appliance merchandising was extensive and he was very generous in sharing his knowledge and experience with others. He was 52 years of age. Surviving are Mrs. Valentine and one daughter.

Lloyd William Rinaman

THE death of Lloyd William Rinaman, president of the Crystal Ice Co., Dallas, Tex., and founder of the Quality Ice Co., Dallas, occurred Friday night, March 9 at his home in Dallas. He was 64 years old.

Mr. Rinaman came to Dallas in 1912 and worked as an electrical and refrigeration engineer for a brewing company. In 1919 he went into business himself by organizing the old Crystal Ice Co. He built the now defunct Arctic Ice Co. plant and in 1925 built the Quality Ice Co. plant. He was secretary-treasurer of this firm at the time of his death. The present Crystal Company was organized by him in 1931.

Surviving are his widow, a son W. A. Rinaman and a daughter, Mrs. W. A. Wood.

Henry M. Davega

THE death of Henry M. Davega, ice manufacturer, Columbia, S. C., occurred March 11 after being critically ill for three days. He was 64 years of age. Mr. Davega was owner and manager of the Crystal Ice Co., Charleston; the Brookland Ice & Fuel Co., Columbia; the Lexington Ice & Fuel Co., Lexington, and the City Ice and Fuel Co., Florence. For a number of years he was coowner of the Chester Drug Co. of Chester and was also in the ice business in that city. He was a member of St. John's Episcopal Church of Columbia. Survivors include his widow, Mrs. Carrie Pool Davega; a daughter, Mrs. Wolfe of Florence, and two sons, Sumner of Charleston and Henry M. Jr. of Columbia.

LEON GUGGENHEIMER, president of the Arctic Cold Storage Co., Philadelphia, Pa., died March 14 at his home in Philadelphia. He was a member of the American Legion and a Mason. Surviving are his widow, Mrs. Esther Guggenheimer, and two sisters.

JOHN KILGARIFF, resident of Pittsburg, Pa., for more than sixty years, died February 23 at the age of 85 years. A native of Ireland, he had been in the ice business since coming to Pittsburgh. He was employed by the old Chautauqua Ice Co. and continued with the firm when it was taken over by the Consolidated Ice Co. He retired last year. Surviving are three daughters, two sons and eight grandchildren.

HENRY B. PHELPS, general manager for the Irvington Ice & Cold Storage Co., Indianapolis, Ind., died January 27 at St. Vincent's Hospital after a short illness. He was 63 years old. A former resident of Lexington, Ky., Mr. Phelps had been in Indianapolis about 18 months, going there from Louisville, Ky.

PETER A. HINNERSHITZ, president of the Reading Merchants Ice Co., Reading, Pa., died at his home February 22. He was 83 years old. The last survivor of the original founders of the ice company, Mr. Hinnerschitz was formerly employed by the Reading Ice Co., and after 1902 conducted a wholesale and retail liquor business.

HAROLD CHARLES DIETRICK a salesman for the City Ice Co., Wichita, Kans., died January 22. He was 56 years old. Mr. Dietrick was born in Wichita and was a veteran of World War I. Surviving are his widow, one son and two daughters.

It's Good Ice Weather In Australia

DOWN in Australia, according to a Canadian member writing to the Canadian Ice Association secretary, they are having the most consistent and hottest summer for many years. The fifty year old record for high temperatures has already been broken and a few more days of the 90 degree temperature will mark an all time record. Ice sales are booming and running 33⅓ per cent above those of the corresponding period last year.

The Canadian ice letter comments that it has been said that the weather in Canada follows closely that of Australia, so everyone is urged to get their house in good order and be prepared for a red hot summer. It should be kept in mind, however, that even with a red hot summer, more ice can be sold if each has the interest to go out and develop new markets.

All North American ice men can take it from there. No one has the gift of prophecy but it would be embarrassing, after three bad years, to have to look at bare storage rooms and dig up the old signs "Out of Ice."

the low-cost
low-temperature
BRINE MEDIUM

SOLVAY
Calcium Chloride

Dealers and warehouse stocks in principal cities.
Write for your free Brine Maintenance Chart.

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ALLIED CHEMICAL & DYE CORPORATION
40 Rector Street New York 6, N. Y.

SOLVAY
Alkalies Chemicals
50 YEARS OF SERVICE
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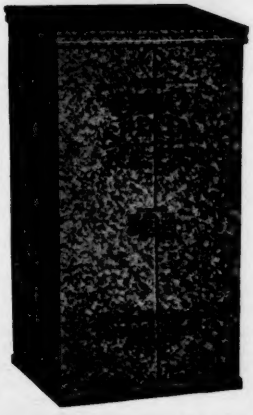
OHIO SPECIAL ICE CANS



Double Riveted
Welded
Integral Tube Cans
Arctic Pownall Cans
Can Baskets
Condenser Trough

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Industrial Trucks
and Trailers

THE OHIO GALVANIZING & MFG. CO.
NILES Established 1902 OHIO

What's New

MACHINERY
APPLIANCES • PROCESSES

All Purpose Filter For Cooling Systems

AN all purpose filter for all cooling systems such as radiators and other types of cooling systems for internal combustion engines as well as cooling systems for many types and uses is being produced by the Austin Engineering and Manufacturing Company of El Paso, Texas. There are 12 gallons; 25 gallons; 50 gallons; 100 gallons; 150 gallons; 200 gallons; and special sizes for larger cooling systems. This filter uses a replaceable cotton element treated with a vegetable compound that goes into solution immediately and begins protection and correction for scale and rust problems.

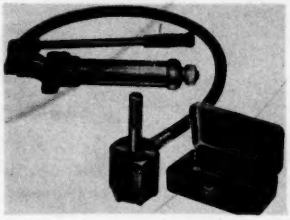
Beam Scales Converted To Automatic

A revolutionary development in automatic scale indication has been announced by the Howe Scale Company, Rutland, Vt., with the introduction of the new Weightograph. A weighing accessory, the unit can be attached to any make of beam scale, or to any scale convertible to beam operation, making an old-fashioned beam scale an "automatic" of the latest type. It is simply attached to the beam shelf and connected to the beam with a rod.

The Weightograph features a non-protruding periscope with a convenient eye-level screen which instantly flashes the exact weight in large, illuminated figures for speedy and accurate reading. It is designed with a method of optical projection which increases image brightness and contrast five times. The image is read off the mirror instead of a ground glass screen, which contributes greatly to the readability of the image under all sorts of light, including daylight. The reading line length is 180 inches (15 feet). The manufacturer has published a folder, Form 668 which gives detailed description.

New Pump Operated Draw Bar Pulls Holes in Metals

A new pump operated draw bar is marketed, completely assembled and packed in a compact, portable metal carrying case by the Patterson Equipment Co., Denair, Calif. Known as the Ohio Draw Bar, the makers explain that it pulls ½ in. to 4 in. size holes in sheet metal, switchgear housing, outlet boxes, without manual exertion; will not warp, break, tear or distort metal; eliminates danger of short-circuiting adjacent wires on conduit box installations. Originally designed to replace hand operated knockout punches, and used principally by electrical workmen, the device is now employed for a variety of industrial purposes, i.e., in pulling motor bearings, and in food processing plants for punching grading tables.



New pump operated Ohio Draw Bar

Thirty pound pressure on handle produces 12,000 lb. pressure on cutting surfaces, cuts a clean, smooth-edge hold in less than a minute. It is claimed to be fast, flexible and simple to operate and performs in any desired position with pump at vertical or horizontal angles. It uses cutters now standard for hand-operated knockout punches.

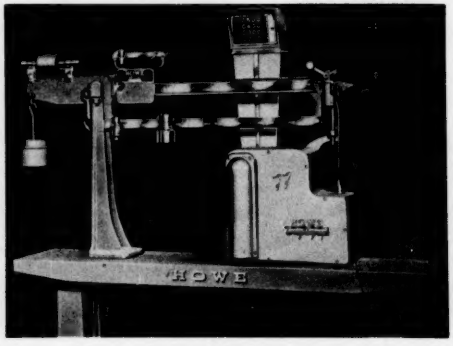
New Portable Ice Box

THE Carri-Ette is a portable ice box or basket that is light, moisture-tight and strong. In demand to protect frozen foods from store, cold drinks to picnics, fresh caught fish, etc., for it keeps food cold up to 10 hours. Picnic lunches keep hot for hours too.

New Carri-Ette for Iced Foods

Made on a new principle of a heavy cellulite fiber liner that is heat insulating and waterproof, covered with attractive plasticized fabric in red, blue, brown or green. Basket is 12 x 9 inches and 10 inches deep and will hold 10 beverage bottles with ice. When shopping, frozen food remains frozen for hours, avoiding spoilage. Packages will "nest" perfectly for storage, occupying but small space.

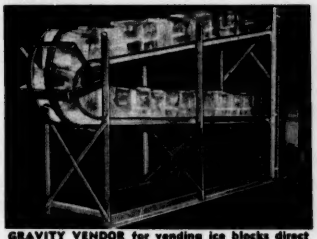
Made by The Rey Company, 1471 W. Fond du Lac Avenue, Milwaukee 5, Wis., Carri-Ette is now ready for volume distribution for 1951 summer selling.



The new Weightograph unit is shown attached to a beam scale. The weight figures are shown in enlarged projection at top and the manufacturers call attention to the speed with which the scale reaches balance.

ADD CUSTOMERS
AND INCREASE PROFITS

NOW you can convert your ice plant sales from attendant service to 24 hour automatic self-service for as little as $420.00. A complete installation of Model 25A (capacity 27—25 lb. blocks) and Model 50 A (capacity 19—50 lb. blocks), including your preference of coin operated (with totallizer feature), lever operated, or slide operated coin mechanisms for $840.00 f. o. b. Chicago.



GRAVITY VENDOR for vending ice blocks direct to your customer.

Four types of Frigid-Vend Machines offer a complete line from which to choose the ones best suited to your ice rooms and to your customer's requirements.

Make your selection from these star performers:

- ★ **GRAVITY FEED**—vends 25 and 50 lb. blocks.
- ★ **CONTINUOUS METAL BELT**—vends bags and blocks from separate decks.
- ★ **CHAIN DRIVE**—double-deck for bags or cartons.
- ★ **FOUR DECKER**—chain drive for combination bag and block delivery.

Write for complete literature on Frigid-Vend vendors

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Frigid-Vend Vendors are available through:

Preston-Bugeon Refrigeration Co.
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Ice Plant Equipment Co.
2543 Frankford Ave.
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G. H. Voter Co.
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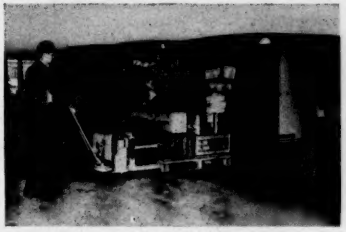
MOTO-TRUC HI-LIFT STACKER

Operating in the NEW cold storage rooms of
The FISHER BROS. Co.
Cleveland

MOTO-TRUC PALLET TRUCK

at Fisher Bros. Co. loading pallet loads of vegetables onto trucks for delivery to their stores.



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POSITIVELY THE SHORTEST OVERALL LENGTH TRUCK OF ITS TYPE IN THE INDUSTRY

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SEE OUR EXHIBIT
at
NATIONAL MATERIALS HANDLING EXPOSITION, CHICAGO, April 30 to May 4, Booth 201.

Let us show you the latest types of MOTO-TRUCS with 12-volt and higher voltage.

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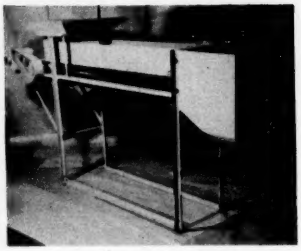
WRITE FOR BULLETIN NO. 51 AND SPECIFICATIONS

The MOTO-TRUC Co.
1953 E. 59th Street
CLEVELAND 3, OHIO.
Originators and world's largest exclusive manufacturers of motorized, battery operated walkie type trucks

Vendor Sells Bulk Coal

A bulk coal vendor that will be of interest to ice dealers who also retail coal has been introduced by the Thermo Cuber Co. Inc., Chicago, Ill. This device illustrated below may be set up in the coal yard and the coin box installed on the outside wall



The Thermo bulk coal vendor ready for installation.

close to the vending spout. The customer inserts a half dollar coin in the coin slot and automatically the machine will vend the quantity of bulk coal the dealer wants to sell for 50 cents. The quantity of coal vended may be increased or decreased by making one simple adjustment in the coin box.

This small customer operates coin slide and receives his coal.

For the 1/3 hp motor, one electrical connection is required. The switch controlling the vending of the coal is simple, insuring positive operation. There are no complicated parts to service because of the simple action of the mechanism. In fact the manufacturer says that keeping the hopper filled with coal that leads into the small hopper of the vender is practically the only servicing required. It is equipped for operation on 110 volt current, A.C. Dimensions are: overall length, 9 ft.; overall height, 4 ft. 9 in.; width, 2 ft.

This vendor makes it possible for retailers to provide their customers with twenty-four hour service, seven days a week.

Solders Developed That Conserve Tin

THE development of a group of solders which permits savings of 50 percent or more in the tin normally used for solders has been announced by the newly formed Metals Conservation Committee of Federated Metals Division, American Smelting and Refining Company. Extensive research has been devoted to this project and results indicate that silver is the only metal readily available in volume that can be satisfactorily substituted for part of the tin in solder. There is virtually no loss in working efficiency and cost is less than that of the alloys they are designed to replace.

The new tin-conserving solders are basically silver-tin-lead alloys as compared with the usual tin-lead variety. The addition of a small percentage of silver permits a marked reduction in the tin content, at the same time giving a joint at least as good as that given by the original alloy. This solder group is an outgrowth of a similar series of solders developed and produced by Federated Metals Division during World War II. It was proved in that crisis that industrial soldering operations could be continued without fear of failure through use of these lower tin solders.

It was pointed out that for such a typical application as the joining of sheet metal—in heating or air conditioning work for example—the new ST-30 (30 percent tin) solder would perform as well as the commonly used 50 percent tin-50 percent lead or 40 percent tin-60 percent lead solders.

While it is difficult to recommend specific substitutions because of varying processes and requirements, it can be generally stated that where 35/65 is used in the soldering of end seams in can manufacture, ST-25 is considered satisfactory.

The same fluxes can be used as heretofore, and the identical means of application are completely satisfactory. ST solders do require slightly more heat to melt, but this is compensated for by the fact that too much heat is not as harmful as it is to the usual tin-lead solders. Generally speaking, ST solders can be used for every purpose where tin-lead solders have been used.

The Metals Conservation Committee is scheduled to meet regularly. Several projects are under way to develop further ways of conserving critical non-ferrous metals.

MANUFACTURERS' NEWS

Armstrong Cork Reports Record Year

THE Armstrong Cork Company in 1950 sold $186,766,670 worth of goods, the largest volume in its history, and net earnings after taxes reached a new high of $12,433,231, C. J. Backstrand, President, reported in the annual statement mailed to stockholders recently. The 1950 net profits, which represent a return of 6.7 per cent on sales, compare with 1949 net profits of $10,224,215 on a sales volume of $163,323,948.

Discussing the company's general outlook, Mr. Backstrand stated that sales prospects for the months ahead are "favorable" throughout the company's diversified lines. He explained that an increasing number of the company's products probably will serve defense needs and record consumer income promises to support a high level of civilian business.

Earnings on the common stock last year, on the basis of the income of domestic companies only and after deducting dividends paid on the preferred stock, were $8.13 as compared with $6.57 the previous year. Total dividends paid on preferred and common stock amounted to $6,249,225, compared with $5,191,057 in 1949, the increase representing larger dividend payments on the common stock—$3.75 per share in 1950 versus $3.00 in 1949.

The company's 1950 tax bill—Federal, state and local—amounted to $13,371,448, compared with $8,503,013 paid in 1949.

Carrier Corp. Annual Report

NET profit of Carrier Corporation (air conditioning, refrigeration and industrial heating) for the twelve months ended January 31, 1951, was $3,948,652 or $5.74 per common share, as compared with $1,315,844 or $1.84 per common share for the preceding similar period.

Completed sales totaled $70,218,500 and new orders were booked in the amount of $75,601,236, exclusive of government contracts covering equipment unrelated to Carrier's normal production. The comparable figures for the twelve months ended January 31, 1950, were $43,779,376 and $45,335,558, respectively.

On January 31, 1951, the Corporation had a backlog of unfilled orders amounting to $34,390,881 as compared with $20,680,150 a year earlier. No extraneous defense business is included in these figures. Actual commitments in this classification now total approximately $17,000,000 and other government contracts are in the process of negotiation.

BOWER
B B BRAND
AMMONIA

Purity of product and immediate shipment are two good reasons for specifying Bower Brand. Please keep empty cylinder rotating.

Est. 1858

HENRY BOWER CHEMICAL MANUFACTURING COMPANY
29TH AND GRAY'S FERRY ROAD
PHILADELPHIA 46, PA.

Head Pressure REDUCED by 50 lbs.

Here's proof of actual results with a Rex Air Purger. When you purge your refrigeration system of non-condensable and permanent gases you reduce head pressure and lower power costs. Investigate today—Write Dept. IR.

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MODERN REFRIGERATION

This official organ of the British Refrigerating Industry incorporates the two original British Journals *"Cold Storage & Produce Review"* and *"Ice & Cold Storage"*. Now in its 52nd year, *"M.R."* gives the latest reliable technical and practical information.

Subscription, post free,.....$3.00 a year

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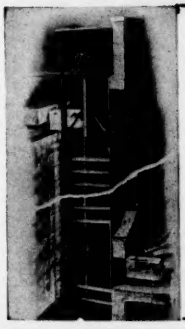

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Double Gig Ice Hoist
Fast - Sturdy - Dependable -
Send for details

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Only the Highest Quality Merchandise and efficient service necessary for the proper and profitable operation of your business. Write for our 1951 catalog.

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LITTLE GIANT
ICE BREAKERS
Truck Model—Gas Engine Driven

INCREASE YOUR PROFITS BY DELIVERING FRESHLY BROKEN ICE IN SIZES FOR ALL NEEDS RIGHT AT THE DOOR

- Instantly Adjustable Grate
- Diamond Point Picks
- Easy Starting Briggs & Stratton Engine

Model WP-76

WRITE FOR DESCRIPTIVE CIRCULAR

MICRON, Inc., Dept. I BETTENDORF IOWA

Owens Elected President Roots-Connersville

THE election is announced of Robert H. Owens as president and general manager of Roots-Connersville Blower Corp., succeeding John Avery who died January 13.

Robert H. Owens

Mr. Owens, a graduate of Purdue University, came to Connersville in 1925 to join the engineering staff of the P. H. & F. M. Roots Co., a predecessor of Roots-Connersville. Prior to joining Roots, Mr. Owens had a variety of industrial experience. He was actively connected with the development of the centrifugal line of blowers built by R-C, and has had many years of experience in building blowers.

In May of 1946, Mr. Owens was named vice-president in charge of engineering and manufacturing, and in July of 1948 he was elected to the board of directors of Roots-Connersville.

Rodney Lauer Heads York Engineering and Research

RODNEY F. LAUER, one of America's pioneers in the development of high altitude chambers and all-weather rooms for the Armed Forces, has been named vice-president in charge of engineering and research by York Corporation of York, Pa. Mr. Lauer, who has been with the air conditioning and refrigeration firm since he received his degree in mechanical engineering at Cornell University in 1930, had been managing York's Pacific district since 1944.

Rodney F. Lauer

During World War II, he engineered the first combination "strato" chamber and all-weather room for the U. S. Navy, and has since played a major role in the development of similar projects for the armed services. These projects are needed to study the effect on men, materials and mechanisms when subjected to reduced pressures and low temperatures at extremely high altitudes, and for rapid changes in pressures and temperatures. When a highly sensitive air conditioning plant was needed during the war for the manufacture of radar and television tubes, Mr. Lauer was given the task of engineering the system, which at the time was regarded as one of the most difficult problems in the air conditioning and refrigeration industry.

While an undergraduate at Cornell University, Mr. Lauer, who is a native of York, Pa., worked in the York Corporation shops during vacations. After graduating from Cornell, he entered the York student engineering training course, after which he was assigned to York's middle atlantic district with headquarters in Philadelphia as a field engineer.

He remained in Philadelphia until 1942 when he became manager of the York national service office in Washington, D. C., where his successful administration in the war effort led to his subsequent promotion to district manager, Pacific District. One of his major administrative tasks for the York firm was to consolidate its two west coast districts into one large district to more efficiently expedite the expanding York Corporation markets there.

Frick Representative on Tour of Latin America

FRICK COMPANY is sending Joaquin Alvarez on a trip through Central and South America. Mr. Alvarez, a graduate engineer, will contact those in need of equipment for refrigerating, air conditioning, food freezing and ice making.

Ralph R. Newquist

Ralph R. Newquist, who became vice-president in charge of sales for Roots-Connersville in May of 1946, has been elected executive vice-president. Mr. Newquist is a graduate of Penn State College. Before joining Roots-Connersville, he was manager of the Washington sales offce for the Allis-Chalmers Manufacturing Co.

Roots-Connersville Blower Corp. is a subsidiary of the Dresser Industries, Inc., whose headquarters are in Dallas, Texas.

District Manager Receives York President's Trophy

M. S. LEBAIR, left, district manager of York Corporation's Middle Atlantic District, happily receives the coveted President's Trophy from John R. Hertzler, vice-president and general sales manager, after his district topped York's seven other districts in respect to overall sales performance during the year 1950. The presentation was made during the recent Hall of Fame Banquet following the York Sales show held at Philadelphia's Benjamin Franklin hotel. In addition to the President's Trophy, Lebair's district won the two VEEP awards for outpointing the other districts both in the best distributor-dealer sales performance and for the best industrial sales performance. Mr. Hertzler pointed out that it was necessary for a district to win both VEEP awards to be eligible for the President's Trophy.

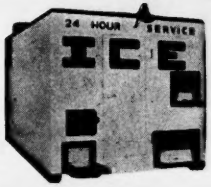
V·P·L FOR ANY SEASON—

Varying seasonal demands require air supply according to the load. With R-C Rotary Positive Blowers, you can adjust to needed Volume at required Pressure and Low power cost. Simple in design and construction, R-C Blowers maintain V.P.L. for years of satisfaction. Ask us about your needs or write for free Bulletin 21-B-37.

Roots-Connersville Blower Corporation
510 Columbia Avenue, Connersville, Indiana

ROOTS-CONNERSVILLE
ONE OF THE DRESSER INDUSTRIES

GET MORE PER TON in '51



with STURDY-BUILT
ICE VENDING STATIONS & VENDING EQUIPMENT

Sell packaged ice for more profit per ton. Self-Service sales with STURDY-BUILT Stations helps increase tonnage and reduces operation costs.

Shipped completely assembled — ready for operation. Attractive modern design. Lowest possible initial cost—minimum operation cost. Known for service and durability.

Product of F. B. Dickinson & Co.
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SEND FOR PRICES & SPECIFICATIONS

INCREASE YOUR PROFIT
WITH IMPROVED AUTOMATIC
LOADER SHAKER SIZER

This new Bateman unit, incorporating revolutionary design that eliminates vibration on frame of shaker, assures added years of service and economy. One man can keep unit in operation, bagging and loading magazine.

Three sizer screens, running on roller bearing in counter-balancing action, operate without vibration. Screen openings, 1½", ¾" and ⅜". Shaker motor ½ H.P. Processes 175 lbs. of ice per minute.

Slow revolving drum, 12 large teeth, hold snow to absolute minimum. Removable plate on side of crusher so teeth can be changed easily and quickly. Five grate adjustments to help size ice before it reaches sizing screen.

LOW PRICE: Complete with motors, switches and galvanizing. F.O.B. Mineral Wells, Texas **$1,424.50**

WRITE TODAY FOR FULL INFORMATION

Bateman
Ice Processing Equipment
MINERAL WELLS, TEXAS

QUALITY COILS FOR ALL APPLICATIONS

WELDED HEADERS, PIPE BENDS AND AMMONIA RECEIVERS

Whether your next job be for a single bend, or coil or complete piping system, Chicago Nipple can supply your requirements. Experienced workmen, practical engineers, and modern equipment reflect the quality of our products.

Coils are of selected ammonia pipe—all joints are electrically welded—checked under water with an air pressure of 300 pounds to guarantee tightness.

SEND DRAWING OR BLUE PRINT FOR QUOTATION

CHICAGO NIPPLE MFG. CO.
1997 Clybourn Ave., Chicago 14, Ill

Johns-Manville Elects New Officers

AT a special meeting of the Board of Directors of Johns-Manville Corp., Leslie M. Cassidy was elected chairman of the board and chief executive officer of the corporation and Adrain R. Fisher was appointed president.

Mr. Cassidy succeeds to the post left vacant by the death on February 26, 1951, of Lewis H. Brown who had been chief executive officer of Johns-Manville since 1929, first as president and, from 1946, as chairman of the board. Mr. Fisher succeeds Mr. Cassidy, who became president on the retirement of R. W. Lea on January 31, 1951.

Clifford F. Rassweiler, vice-president for research and development, who was elected vice chairman of the board and a director on January 31, 1951, continues in those duties and in addition will continue to have full responsibility for organization and direction of the company's new planning board, and will serve as assistant and alternate to the chairman.

The Board also adopted a resolution memorializing the services of Lewis H. Brown to the corporation.

Easier and Cheaper with

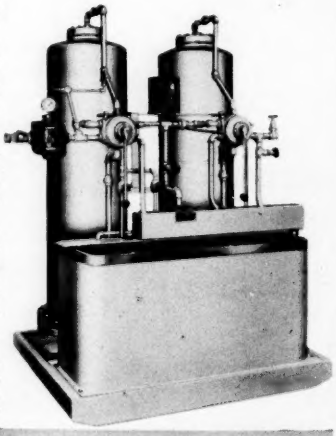
INDUSTRIAL Water Demineralizer

It's worth looking into . . .

The demineralization of water is not something new. It is used in the food industry, in the chemical and other industrial processing where chemically pure water is used in quantity. The very low cost warrants your looking into it.

Here are some of the advantages you get with an INDUSTRIAL demineralizer in ice making. Since the dissolved mineral salts in ordinary water are removed in passing through the ion-exchange resins, core-water removal and replacement is unnecessary. Losses due to cracking are greatly reduced. Freezing at the lower brine temperature increases daily yield. And the bulk of the cake of ice is clearer—your customers will notice that.

If you will send us an analysis of the water you are using, the quantity you need, and at what rate (gallons per hour) we will send you information on INDUSTRIAL demineralizers, estimate of costs, performance data, etc. Better do it now.



A typical two-bed INDUSTRIAL Water Demineralizer. Standard models available with capacities up to 1000 gph. Special units of any capacity engineered to requirements.

FILTERS Pressure Type · PUMPS Centrifugal · CORROSION TESTING APPARATUS Salt Fog • Humidity

INDUSTRIAL FILTER & PUMP MFG. CO.

5914 Ogden Avenue
Chicago 50, Illinois

RUBBER DIVISION Vulcanized Linings • Molded Products · WATER DEMINERALIZERS

Martocello Announces New Southern Distributor

THE appointment of Industrial Products Company, 185 Harris Street, N.E., Atlanta, Ga., as their representative in the states of Georgia and Alabama is announced by Joseph A. Martocello & Company of Philadelphia. W. T. Leak, head of Industrial Products Company, stated that he and his associates felt that adding the Martocello line of ice-making equipment and air-agitation systems would help them to be of greater service to their customers and to the ice making industry in general in Georgia and Alabama. Joseph B. Cadwalader, general manager and executive head of Joseph A. Martocello & Company, stated that this appointment was in line with their policy of securing high-type representation to give local, personal service on Martocello products to the ice industry in these two states.

Skating Rink Designers Form Partnership

FORMATION of a partnership, Carpenter Ice Rink Floors, to carry on the M. R. Carpenter Monolithic Concrete Floating Floor and Piping System structures and to build floors for every application in the field is announced by E. R. Carpenter, 1560 Ansel Rd., Cleveland, Ohio, and G. A. Post, consulting engineer, 1313 No. Capitol, Indianapolis, Ind.

Recent Carpenter installations engineered by Post are the Wollman Memorial Rink, Central Park, N.Y., Cambria County War Memorial Building, Johnstown, Pa., Sioux City Auditorium, Sioux City, Iowa. Installations under construction include The Denver Municipal Stadium, Denver, Colorado; the Civic Auditorium in Butte, Montana; the Onondaga County War Memorial Auditorium, Syracuse, N.Y.

Armstrong Cork Assigns Men to District Offices

SIX members of the Armstrong Cork Company's Building Materials Division industrial products sales training class have completed their course and have been assigned to district offices throughout the country, H. R. Peck, vice-president and general manager of the Building Materials Division, has announced.

William H. Burnett, of Newark, Del., has been assigned to the St. Louis district office; George E. Dabney, of Baytown, Texas, to the Dallas district office; James M. DeMott, of Somerville, N. J., to the Baltimore district office; James E. Johnson, of Columbus, Ohio, to the Pittsburgh district office; John A. Kuhnen, of Glencoe, Ill., to the Chicago district office, and John U. Weber, of Irvington, N. J., to the Kansas City district office.

Steam Baked

Reliable TRADE MARK Corkboard

- 30 years serving the Refrigeration, Cold Storage, Meat Packing Industries, and Ice Plants.
- Prompt shipments anywhere.
- Your inquires invited!

LUSE-STEVENSON CO., INC.

879 Blackhawk Street
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DISTRIBUTORS WANTED

INCREASE YOUR PROFITS

Happy Says—
YOUR PROFITS JUMP WITH—

"HAPPY" ICEMAN prefers

MASTER POINT ICE PICKS
SOLD THRU THE NEW
"TAKE-A-PICK" MASTER POINT PICK VENDOR
WRITE OR WIRE
HALSEY MFG. CO., Evansville 2, Ind.

A Book Written for the Engineer

The author, a man well versed in the construction and operation of ice making and refrigerating systems, has intended this work as a practical help to the engineer in his every day problems.

PRACTICAL REFRIGERATING ENGINEERS' POCKETBOOK

By John E. Starr

eliminates algebraic terms and tells the engineer in a simple manner how to determine if his plant is operating at the highest efficiency.

Cloth Binding, $2.50

NICKERSON & COLLINS CO.
435 N. Waller Ave., Chicago

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Cooling Towers, Condensers—
Wherever Water Is Used

Use Wright Water-Conditioning Chemicals in refrigerating and air-conditioning equipment — wherever water is used—to control scale, corrosion and bacteria. Increase the efficiency and life of equipment and be assured of long, maintenance-free performance.

WRIGHT CHEMICAL CORPORATION

Wright CHEMICALS

Specializing in Water Conditioning
GENERAL OFFICE AND LABORATORY
633 West Lake Street, Chicago 6, Ill.
OFFICES IN PRINCIPAL CITIES
Sole Distributor of Nelson Chemical Proportioning Pumps

DIMCO CAST ALUMINUM FIN EVAPORATING COIL

★ *Saves Space*
★ *Saves Weight*
★ *Saves Cost*

CAN BE USED WITH ANY REFRIGERANT
SALES AGENCIES SOLICITED

Manufactured by
DETROIT ICE MACHINE COMPANY
2615 Twelfth St., Detroit 16, Mich.

Typical Ice Cream Storage Room Installation
Minus 15° F.

CATALOGS AND BULLETINS

New Link Belt Catalog

THE Link-Belt Company has started distribution of its new 1,296-page catalog. It contains 1,673 tables and charts of basic data that greatly simplify the problems of designing all kinds of conveyor systems, mechanical power transmission and many different types of processing machinery.

Copies of the eight-pound book, which has been three years in preparation, are being distributed as rapidly as possible to industrial and engineering firms, engineering schools and libraries. All available copies are being used to cover engineers, estimators and purchasing executives, in whose hands this information will contribute to the rapid solution of immediate problems.

A primary function of the book, which is identified as Link-Belt General Catalog 900, is service as a reference tool. It presents basic engineering data facilitating the selection of chains and wheels, drives, power transmission elements, conveyors and process machines in the combinations which will best satisfy a wide range of functional requirements and operating conditions.

Booklet on Icebuilder For Sweet Water Cooling

THE practical as well as the technical aspects of the use of ice builders to provide economical sweet water cooling is the subject of a completely new 8-page booklet available from The Creamery Package Mfg. Co. The booklet describes how ice builders "store cold" in the form of ice built up on coils to furnish a reservoir of refrigeration to level out peak cooling loads and increase flexibility of operation. It explains why ice builders require less horsepower than brine or direct expansion systems and indicates typical conditions in which use of an ice builder is advantageous. Specifications and descriptions of various capacity ice builders are also included.

Bulletin Describes New Respiration Instrument

THE M-S-A Pneolator, which now makes possible automatic artificial respiration without suction, is described in a new 4-page bulletin No. CH-2, published by the Mine Safety Appliances Company. The recently introduced Pneolator uses intermittent positive pressure to provide safe, uniform lung ventilation in cases of respiratory failure. In operation, the M-S-A Pneolator automatically inflates the lungs with oxygen in the right amount and at the right pressure for the unconscious victim's physical requirements. No suction is employed, exhalation taking place by normal passive return of respiratory muscles in the lungs from the expanded state of inhalation.

Frick Bulletin Describes Shell Ammonia Condensers

SHELL ammonia condensers, Type V S are illustrated and described in a recent "Ice and Frost" bulletin issued by Frick Co., Waynesboro, Pa. It explains that these condensers are adaptable to all kinds of refrigerating systems and plant construction. The bulletin is illustrated with actual installation pictures.

Circular on Roof Cooling

A CIRCULAR on roof cooling has been issued by Ruppright's Rotary Roof Cooler, Los Angeles, Calif. The R.R.R. cooler, described and illustrated in the circular, removes building heat at the source, the roof. It has been designed to work by itself or in support of air conditioning, singly or any number of them coordinated. Since air conditioning chiefly removes heat that penetrates the building, these coolers, it is claimed, greatly reduce the load.

Advantages of VOSS COMPRESSOR VALVES

1 LARGER GAS PASSAGE AREA
From 20% to 100% increased valve area handles more and colder gas; a colder therefore denser gas costs less to compress.

2 LARGER VALVE AREA
Raises back and lowers head pressure, consequently reduces compression ratio—saving more power.

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Correct design—best materials—careful workmanship—means continuous performance.

4 SAFE
No castings used—therefore no invisible blow-holes or cracks which insures safety of operation. Gas passages drilled, slotted and milled smooth—hence less friction.

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Made to the highest standard of workmanship—on special machines—by craftsmen—in a modern and well equipped shop—designed to give long life under the severest conditions.

6 NOISELESS
Smooth running—with less power—at higher speeds—without overheating.

7 ECONOMICAL
Increased capacity at a definite saving in power—replaces your present valves without any change in your compressor.

DEFINITE SAVINGS after installing J. H. H. VOSS VALVES REG. U.S. PAT. OFF.

in your compressors

VOSS VALVES are indispensible for use where loads are heaviest; where lower operating costs are important; where safety and reliability are paramount. Increased speed after change over to VOSS VALVES often makes it possible to carry load with one compressor instead of two needed before.

Quotations and estimates on VOSS VALVES furnished on request. Case histories and testimonials of installations similar to your own supplied. Send us the name, bore, stroke and speed of your air, ammonia, or gas compressor of any type or size.

J. H. H. VOSS CO., Inc. 785 East 144th Street NEW YORK 54, N. Y.

THE BUYERS DIRECTORY

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Vogt Machine Co., Henry, Louisville, Ky.

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AIR COMPRESSORS
Frick Co., Waynesboro, Pa.

AIR CONDITIONING EQUIPMENT
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ASPHALT PRODUCTS
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BRINE COOLERS
Acme Industries, Inc., Jackson, Mich.
Dersch, Gesswein & Neuert, Inc., Chicago, Ill.
Frick Co., Waynesboro, Pa.
Kehoe Machinery Co., Inc., R. P., Ridgefield Park, N. J.
Reynolds Mfg. Co., Springfield, Mo.
Vogt Machine Co., Henry, Louisville, Ky.

BRINE SPRAY COOLING
Acme Industries, Inc., Jackson, Mich.
Frick Co., Waynesboro, Pa.
Ice Plant Equipment Co., Inc., Philadelphia, Pa.
Martocello & Co., Jos. A., Philadelphia, Pa.

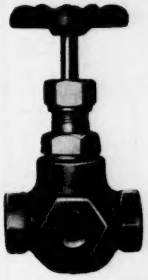
CALCIUM CHLORIDE
Solvay Sales Div., Allied Chem. & Dye Corp., New York, N. Y.

CAN DUMPS
Frick Co., Waynesboro, Pa.
Gifford-Wood Co., Hudson, N. Y.
Ice Plant Equipment Co., Inc., Philadelphia, Pa.

(Buyers Directory continued on next page)

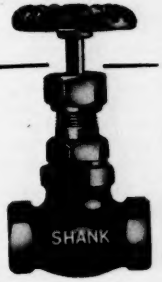
SHANK
REFRIGERATION PRODUCTS

Recognized as The Symbol of Quality



3-WAY DUAL SHUT-OFF VALVE

For use where Refrigeration Codes require dual relief valve installations. Stainless steel stem. Indicator plate on hand wheel shows position of valve shut off. Completely rust-proofed.



SEMI-STEEL SHUT-OFF VALVE

Highest grade non-porous metal—full size ports—clean cut threads. Back seated stem—Shank design base—perfect alignment. Long life packing ring.

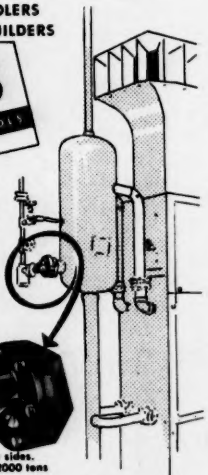
If your jobber doesn't stock—write

CYRUS SHANK CO.
629 W. Jackson Blvd. Chicago 6, Ill.

How to assure
MAXIMUM B.T.U. TRANSFER
in "Packaged" Cooling Units

AIR COOLERS • WATER COOLERS
SHARP FREEZERS • ICE BUILDERS

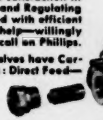
Use **PHILLIPS** FLOAT CONTROLS



Instant response to wide variation in load is one major reason why the use of Phillips Float Controls contributes to high heat transfer efficiency in practically all cooling units. In addition, you gain maximum flexibility with a fewer number of valves to carry in stock because Phillips No. 300 and No. 301 Valves provide capacities of 2 to 50 tons for handling a majority of applications with the same mounting.

For complete satisfaction in Float Controls and Regulating Valves, combined with efficient engineering service help—willingly given—call on Phillips.

No. 300 and 301 Valves have Cartridge Construction: Direct Feed—7 orifice sizes; Remote Feed—8 orifice sizes.



Other Control Valves for high or low sides. Freon: 1 to 1000 tons, Ammonia: 1 to 2000 tons

H. A. PHILLIPS & CO.
Designers and Engineers • Refrigeration Control Systems
3255 W. CARROLL AVE. • CHICAGO 24, ILLINOIS

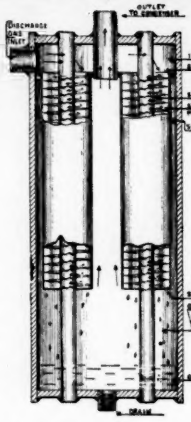
"King Zeero"

OIL SEPARATOR

STOPS OIL FROM ENTERING CONDENSER RECEIVER AND LOW SIDE

Allows operation as was originally intended. Simple in operation — no parts to wear out — no screens, metal wool or any close screens to clog, raise discharge pressures and cut down capacity.

When used in connection with air compressors, water is also separated with the oil.



Built for years of trouble free service. Mechanical details on request.

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1447-55 Montrose Ave., Chicago 13, Ill.

EVAPORATOR PRESSURE CONTROLS

AMMONIA COMPRESSORS

Wolf Linde

Est 1880

FREON VALVES UP TO 12"

AMMONIA VALVES AND FITTINGS

Manufactured and Sold by

DERSCH, GESSWEIN & NEUERT, Inc.

4849 West Grand Avenue Chicago 39, Illinois

THE BUYERS

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Ohio Galvanizing & Mfg. Co., Niles, Ohio
Reynolds Mfg. Co., Springfield, Mo.
Vogt Machine Co., Henry, Louisville, Ky.

CAR ICING EQUIPMENT
Capital Elevator & Mfg. Co., Columbus, Ohio
Gifford-Wood Co., Hudson, N. Y.
Lilly Co., The, Memphis, Tenn.
Tri-Pak Machinery Service Inc., Harlingen, Texas

COILS
Acme Industries, Inc., Jackson, Mich.
Byers Co., A. M., Pittsburgh, Pa.
Chicago Nipple Mfg. Co., Chicago, Ill.
Creamery Package Mfg. Co., Chicago, Ill.
Detroit Ice Machine Co., Detroit, Mich.
Howe Ice Machine Co., Chicago, Ill.
National Pipe Bending Co., New Haven, Conn.
Philadelphia Pipe Bending Co., Philadelphia, Pa.
Rempe Company, Chicago, Ill.
Vogt Machine Co., Henry, Louisville, Ky.

COLD STORAGE CONSTRUCTION
Armstrong Cork Co., Lancaster, Pa.
Frick Co., Waynesboro, Pa.

COLD STORAGE DOORS
Butcher Boy Cold Storage Door Co., Chicago, Ill.
Ice Plant Equipment Co., Inc., Philadelphia, Pa.
Jamison Cold Stge. Door Co., Hagerstown, Md.
Refrigeration Engineering Co., Montgomery, Minn.

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(See Ice Making and Refrigerating Machinery)

COMPRESSOR VALVES
Voss, Inc., J. H. H., New York, N. Y.

COMPRESSOR VALVE PLATES & DISCS
Voss, Inc., J. H. H., New York, N. Y.

CONDENSERS
Acme Industries, Inc., Jackson, Mich.
Creamery Package Mfg. Co., Chicago, Ill.
Dersch, Gesswein & Neuert, Inc., Chicago, Ill.
Frick Co., Waynesboro, Pa.
Howe Ice Machine Co., Chicago, Ill.
Kehoe Machinery Co., Inc., R. P., Ridgefield Park, N. J.
King-Zeero Co., Chicago, Ill.
National Pipe Bending Co., New Haven, Conn.
Philadelphia Pipe Bending Co., Philadelphia, Pa.
Rempe Company, Chicago, Ill.
Reynolds Mfg. Co., Springfield, Mo.
Vogt Machine Co., Henry, Louisville, Ky.

CONSULTING ENGINEERS
Greene, Van R. H., New York, N. Y.
Ophuls & Associates, Fred, New York, N. Y.

CONVEYORS
Capital Elevator & Mfg. Co., Columbus, Ohio
Gifford-Wood Co., Hudson, N. Y.
Lilly Co., The, Memphis, Tenn.

COOLING TOWERS
Frick Co., Waynesboro, Pa.

CORK INSULATION
Armstrong Cork Co., Lancaster, Pa
Luse-Stevenson Co., Inc., Chicago, Ill.

CORROSION CONTROL
Wright Chemical Control Corp., Chicago, Ill.

COUPON BOOKS
Index Coupon & Supply Co., La Porte, Ind.
United Ice & Oil Supply Co., Boston, Mass.
Vivian Mfg. Co., St. Louis, Mo.

COVERINGS (PIPE AND BOILERS)
American Hair & Felt Co., Chicago, Ill.
Armstrong Cork Co., Lancaster, Pa.

CYLINDERS (GAS & LIQUID)
Byers Co., A. M., Pittsburgh, Pa.

DEIONIZING EQUIPMENT
Industrial Filter & Pump Mfg. Co. Inc., Chicago, Ill.

DEMINERALIZING EQUIPMENT
Industrial Filter & Pump Mfg. Co. Inc., Chicago, Ill.

DIP TANKS AND CAN BASKETS
Frick Co., Waynesboro, Pa.
Ice Plant Equipment Co., Inc. Philadelphia, Pa.
Knickerbocker Stamping Co., Parkersburg, W. Va.
Martocello & Co., Jos. A., Philadelphia, Pa.
Ohio Galvanizing & Mfg. Co., Niles, Ohio
Vogt Machine Co., Henry, Louisville, Ky.

DRIVES, TRANSMISSIONS
Frick Company, Waynesboro, Pa.

ELEVATING & CONVEYING MACHINERY
Capital Elevator & Mfg. Co., Columbus, Ohio
Gifford-Wood Co., Hudson, N. Y.
Lilly Co., The, Memphis, Tenn.

ENGINEERS AND ARCHITECTS
(See Architects and Engineers)

ENGINES
Frick Co., Waynesboro, Pa.

EVAPORATIVE CONDENSERS
Niagara Blower Co., New York, N.Y.

EVAPORATORS
Acme Industries, Inc., Jackson, Mich.
Creamery Package Mfg. Co., Chicago, Ill.
Frick Co., Waynesboro, Pa.
Niagara Blower Co., New York, N.Y.
Rempe Company, Chicago, Ill.
Vogt Machine Co., Henry, Louisville, Ky.

FEED-WATER HEATERS
National Pipe Bending Co., New Haven, Conn.
Vogt Machine Co., Henry, Louisville, Ky.

FIBERGLAS
Armstrong Cork Co., Lancaster, Pa

FIELD ICE SAWS
Gifford-Wood Co., Hudson, N. Y.
United Ice & Oil Supply Co., Boston, Mass.

FILTERS, CLARIFYING
Industrial Filter & Pump Mfg. Co., Inc., Chicago, Ill.

FILTERS, WATER
Frick Co., Waynesboro, Pa.
Ice Plant Equipment Co., Inc., Philadelphia, Pa.
Industrial Filter & Pump Mfg. Co., Inc., Chicago, Ill.
Martocello & Co., Jos. A., Philadelphia, Pa.

FILTRATION EQUIPMENT
Industrial Filter & Pump Mfg. Co., Inc., Chicago, Ill.

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Howe Ice Machine Co., Chicago, Ill.
Rempe Company, Chicago, Ill.

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Vogt Machine Co., Henry, Louisville, Ky.

FOOD FREEZING EQUIPMENT
Howe Ice Machine Co., Chicago, Ill.

FROZEN FOOD LOCKERS
Knickerbocker Stamping Co., Parkersburg, W. Va.

FUEL OIL PRE-HEATERS
National Pipe Bending Co., New Haven, Conn.
Rempe Company, Chicago, Ill.

HAND TRUCKS
Ohio Galvanizing & Mfg. Co., Niles, Ohio

HOISTING APPARATUS
Capital Elevator & Mfg. Co., Columbus, Ohio
Ice Plant Equipment Co., Inc., Philadelphia, Pa.
Reynolds Mfg. Co., Springfield, Mo.

HUMIDITY AIR CONDITIONERS
Niagara Blower Co., New York, N.Y.

ICE BAGS
Union Bag & Paper Corp., New York, N. Y.

ICE BLOWERS
Gifford-Wood Co., Hudson, N. Y.

ICE CANS
Ice Plant Equipment Co., Inc., Philadelphia, Pa.
Martocello & Co., Jos. A., Philadelphia, Pa.
Kehoe Machinery Co., Inc., R. P., Ridgefield Park, N. J.
Knickerbocker Stamping Co., Parkersburg, W. Va.
Ohio Galvanizing & Mfg. Co., Niles, Ohio

ICE CAN FILLERS
Frick Co., Waynesboro, Pa.
Ice Plant Equipment Co., Inc., Philadelphia, Pa.
Knickerbocker Stamping Co., Parkersburg, W. Va.
Martocello & Co., Jos. A., Philadelphia, Pa.
Ohio Galvanizing & Mfg. Co., Niles, Ohio
Vogt Machine Co., Henry, Louisville, Ky.

ICE CHIPPERS
Capital Elevator & Mfg. Co., Columbus, Ohio
Gifford-Wood Co., Hudson, N. Y.
Ice Plant Equipment Co., Inc., Philadelphia, Pa.
Martocello & Co., Jos. A., Philadelphia, Pa.
Index Coupon & Supply Co., La Porte, Ind.
United Ice & Oil Supply Co., Boston, Mass.
Vivian Mfg. Co., St. Louis, Mo.

ICE CHUTES
Frick Co., Waynesboro, Pa.
Gifford-Wood Co., Hudson, N. Y.
Ice Plant Equipment Co., Inc., Philadelphia, Pa.
Jamison Cold Storage Door Co., Hagerstown, Md.
Martocello & Co., Jos. A., Philadelphia, Pa.

ICE CONVEYORS
Capital Elevator & Mfg. Co., Columbus, Ohio
Gifford-Wood Co., Hudson, N. Y.
Lilly Co., The, Memphis, Tenn.
Refrigeration Engineering Co., Montgomery, Minn.
United Ice & Oil Supply Co., Boston, Mass.

ICE CREAM PLANTS
Frick Co., Waynesboro, Pa.

ICE CRUSHERS
Bateman Foundry & Machine Co., Inc., Mineral Wells, Texas
Gifford-Wood Co., Hudson, N. Y.
Ice Plant Equipment Co., Inc., Philadelphia, Pa.
Index Coupon & Supply Co., La Porte, Ind.
Kehoe Machinery Co., Inc., R. P., Ridgefield Park, N. J.
Lilly Co., The, Memphis, Tenn.
Martocello & Co., Jos. A., Philadelphia, Pa.
Micron, Inc., Bettendorf, Iowa
Tri-Pak Machinery Service Inc. Harlingen, Texas
United Ice & Oil Supply Co., Boston, Mass.
Vivian Mfg. Co., St. Louis, Mo.

ICE CUBE CONTAINERS
Index Coupon & Supply Co., La Porte, Ind.
Lilly Co., The, Memphis, Tenn.
Union Bag & Paper Co., New York, N. Y.
United Ice & Oil Supply Co., Boston, Mass.
Vivian Mfg. Co., St. Louis, Mo.

ICE CUBERS
Gifford-Wood Co., Hudson, N. Y.
Ice Plant Equipment Co., Inc. Philadelphia, Pa.
Lilly Co., The, Memphis, Tenn.
Martocello & Co., Jos. A., Philadelphia, Pa.
Thermo Cuber Co., Inc., Chicago, Ill.
United Ice & Oil Supply Co., Boston, Mass.
Vivian Mfg. Co., St. Louis, Mo.

ICE CUBING MACHINES
Gifford-Wood Co., Hudson, N. Y.
Lilly Co., The, Memphis, Tenn.
Thermo Cuber Co., Inc., Chicago, Ill.
United Ice & Oil Supply Co., Boston, Mass.

ICE DELIVERY BAGS
Gifford-Wood Co., Hudson, N. Y.
Ice Plant Equipment Co., Inc., Philadelphia, Pa.
Index Coupon & Supply Co., La Porte, Ind.
Lilly Co., The, Memphis, Tenn.
Martocello & Co., Jos. A., Philadelphia, Pa.
Union Bag & Paper Corp., New York, N. Y.
United Ice & Oil Supply Co., Boston, Mass.
Vivian Mfg. Co., St. Louis, Mo.

ICE ELEVATORS AND CONVEYORS
Capital Elevator & Mfg. Co., The, Columbus, Ohio
Gifford-Wood Co., Hudson, N. Y.

ICE HARVESTING MACHINERY & TOOLS
Gifford-Wood Co., Hudson, N. Y.
United Ice & Oil Supply Co., Boston, Mass.

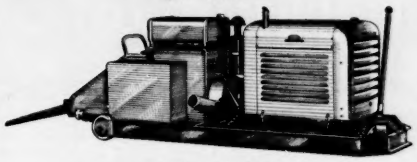
ICE MAKING AND REFRIGERATING MACHINERY
Creamery Package Mfg. Co., Chicago, Ill.
Dersch, Gesswein & Neuert, Inc., Chicago, Ill.
Detroit Ice Machine Co., Detroit, Mich.
Enterprise Equipment Corp., Yonkers, N. Y.
Frick Company, Waynesboro, Pa.
Howe Ice Machine Co., Chicago, Ill.
Ice Plant Equipment Co., Inc. Philadelphia, Pa.
Kehoe Machinery Co., Inc., R. P., Ridgefield Park, N. J.
Reynolds Mfg. Co., Springfield, Mo.
Vogt Machine Co., Henry, Louisville, Ky.

ICE PICKS AND PLANERS
Gifford-Wood Co., Hudson, N. Y.
Halsey Mfg. Co., Inc., Evansville, Ind.
Ice Plant Equipment Co., Inc., Philadelphia, Pa.
Index Coupon & Supply Co., La Porte, Ind.
Lilly Co., The, Memphis, Tenn.

(Buyers Directory continued on next page)

CRUSHED ICE ANYWHERE

Capacity: 6 whole 300 lb. blocks per minute!



with the NEW
GASOLINE-POWERED
Tri-Pak Ice Crusher-Slinger

Power packed for speed and capacity delivery, Tri-Pak's new gasoline Crusher-Slinger crushes and delivers *1800 pounds of ice every 60 seconds!*

Complete self-contained, this Crusher-Slinger unit can be moved easily and quickly on its rubber-tired ball bearing wheels. A heavy "X" type frame of welded channel steel gives rigid support to the loading ramps, the crusher, the slinger and the Ford Industrial Power Unit.

Variable twin ice feeder chains give positive feed of ice blocks into the crusher. A master clutch permits the engine to idle when not in actual use. Crusher drum and impeller wheel are dynamically and statically balanced for smooth operation.

TRI-PAK Machinery SERVICE INC.
HARLINGEN, TEXAS

Write or phone TODAY for complete information about Tri-Pak's gasoline or electric Crusher-Slingers, or Tri-Pak's full line of icing equipment.

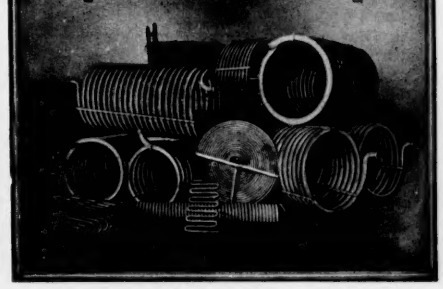
Phone 7713

Philadelphia Pipe Coils

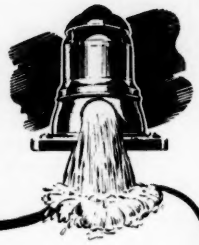
ESTABLISHED 1890

Continuous Welded Pipe Coils of Any Metal, Size or Design

PHILADELPHIA PIPE BENDING CO.
FIFTH STREET & N. P. R. R.
PHILADELPHIA



CONSIDER DURABILITY



The installation of a Layne Well Water System is your guarantee of an abundant water supply with the lowest possible operating cost. The extra durability built into all Layne equipment assures you of dependable performance with little attention and practically no upkeep. For further information, catalogs, etc. address

LAYNE & BOWLER, INC.
General Offices, Memphis 8, Tenn.

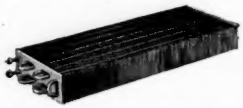
Layne

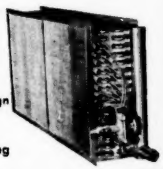
WELL WATER SYSTEMS
VERTICAL TURBINE PUMPS

for Highest Quality
LOOK TO REMPE!

PIPE COILS • FIN COILS
For **Refrigeration, Air Conditioning, and Heating**

Rempe Coils are accepted in the industry as quality equipment that is built for long service without maintenance. Rempe Coils are used on the most difficult jobs and forgotten. This confidence has been earned the hard way—through proper engineering, good quality materials and precision manufacturing.





Coils and Bends of any metal or design engineered to your requirements.
Send us your problems for engineering assistance.

HEAT TRANSFER EQUIPMENT
REMPE CO.
Founded 1890

REMPE COMPANY
340 N. Sacramento Blvd., Chicago 12, Ill.

THE BUYERS

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Index Coupon & Supply Co., La Porte, Ind.
Martocello & Co., Jos. A., Philadelphia, Pa.
United Ice & Oil Supply Co., Boston, Mass.
Vivian Mfg. Co., St. Louis, Mo.

ICE PICK VENDING MACHINES
Halsey Mfg. Co., Inc., Evansville, Ind.
United Ice & Oil Supply Co., Boston, Mass.

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Enterprise Equipment Corp., Yonkers, N. Y.
Kehoe Machinery Co., Inc., R. P., Ridgefield Park, N. J.

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Index Coupon & Supply Co., La Porte, Ind.
Lilly Co., The, Memphis, Tenn.
United Ice & Oil Supply Co., Boston, Mass.
Vivian Mfg. Co., St. Louis, Mo.

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Gifford-Wood Co., Hudson, N. Y.
Halsey Mfg. Co., Inc., Evansville, Ind.
Ice Plant Equipment Co., Inc., Philadelphia, Pa.
Index Coupon & Supply Co., La Porte, Ind.
Lilly Co., The, Memphis, Tenn.
Martocello & Co., Jos. A., Philadelphia, Pa.
United Ice & Oil Supply Co., Boston, Mass.
Vivian Mfg. Co., St. Louis, Mo.

ICE VENDORS
Dickinson & Co., F. B., Des Moines, Ia.
Frick Company, Waynesboro, Pa.
Ice Plant Equipment Co., Inc., Philadelphia, Pa.
Jamison Cold Storage Door Co., Hagerstown, Md.
Refrigeration Engineering Co., Montgomery, Minn.
S & S Vending Machine Co., San Jose, Calif.
Thermo Cuber Co., Inc., Chicago, Ill.
United Ice & Oil Supply Co., Boston, Mass.

INSTANTANEOUS HEATERS
National Pipe Bending Co., New Haven, Conn.

INSULATING MATERIALS
American Hair & Felt Co., Chicago, Ill.
Armstrong Cork Co., Lancaster, Pa.
Luse-Stevenson Co., Inc., Chicago, Ill.
Pacific Lumber Co., San Francisco, Calif.

INSULATION ADHESIVES
American Bitumuls Co., San Francisco, Calif.

LOW TEMPERATURE EQUIPMENT
(See Ice Making and Refrigerating Machinery)

MASKS, AMMONIA
Acme Protection Equipment Co., Chicago, Ill.

MATERIALS HANDLING EQUIPMENT
Moto-Truc Co., The, Cleveland, O.
Ohio Galvanizing & Mfg. Co., Niles, Ohio

OIL AND LUBRICANTS
Socony-Vacuum Oil Co., Inc., New York, N. Y.
Sun Oil Co., Philadelphia, Pa.
Texas Co., The, New York, N. Y.

OILS, CUTTING
Socony-Vacuum Oil Co., Inc., New York, N. Y.
Sun Oil Co., Philadelphia, Pa.
Texas Co., The, New York, N. Y.

OIL SEPARATORS
King-Zeero Company, Chicago, Ill.
Rex Engineering & Sales Co., Oklahoma City, Okla.

OILS, FUEL
Socony-Vacuum Oil Co., Inc., New York, N. Y.
Sun Oil Co., Philadelphia, Pa.
Texas Co., The, New York, N. Y.

PACKINGS
Frick Company, Waynesboro, Pa.
Vivian Mfg. Co., St. Louis, Mo.

PALLET TRUCKS (MOTORIZED)
Moto-Truc Co., The, Cleveland, O.

PIPE COILS AND BENDS
Acme Industries, Inc., Jackson, Mich.
Chicago Nipple Mfg. Co., Chicago, Ill.
Frick Company, Waynesboro, Pa.
Kehoe Machinery Co., Inc., R. P., Ridgefield Park, N. J.
National Pipe Bending Co., New Haven, Conn.
Philadelphia Pipe Bending Co., Philadelphia, Pa.
Rempe Company, Chicago, Ill.
Vogt Machine Co., Henry, Louisville, Ky.

PIPE COVERING
(See Coverings, Pipe and Boiler)

PIPE WELDING
Acme Industries, Inc., Jackson, Mich.
National Pipe Bending Co., New Haven, Conn.
Philadelphia Pipe Bending Co., Philadelphia, Pa.
Vogt Machine Co., Henry, Louisville, Ky.

PIPING
Acme Industries, Inc., Jackson, Mich.
Byers Co., A. M., Pittsburgh, Pa.
Frick Company, Waynesboro, Pa.
National Pipe Bending Co., New Haven, Conn.
Philadelphia Pipe Bending Co., Philadelphia, Pa.
Rempe Company, Chicago, Ill.
Vogt Machine Co., Henry, Louisville, Ky.

PRESSURE BLOWERS
Ice Plant Equipment Co., Inc., Philadelphia, Pa.
Martocello & Co., Jos. A., Philadelphia, Pa.
Roots-Connersville Blower Corp., Connersville, Ind.

PROPELLERS
Ice Plant Equipment Co., Inc., Philadelphia, Pa.

PUMPING MACHINERY
Aurora Pump Co., Aurora, Ill.
Deming Co., The, Salem, Ohio
Ice Plant Equipment Co., Inc., Philadelphia, Pa.
Layne & Bowler, Inc., Memphis, Tenn.
Roots-Connersville Blower Corp., Connersville, Ind.

PUMPING MACHINERY—AIR LIFT
Deming Co., The, Salem, Ohio
Roots-Connersville Blower Corp., Connersville, Ind.

PUMPS, AMMONIA AND BRINE
Deming Co., The, Salem, Ohio
Frick Company, Waynesboro, Pa.
Roots-Connersville Blower Corp., Connersville, Ind.
Vogt Machine Co., Henry, Louisville, Ky.

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Deming Co., The, Salem, Ohio
Layne & Bowler, Inc., Memphis, Tenn.

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Ice Plant Equipment Co., Inc., Philadelphia, Pa.
Roots-Connersville Blower Corp., Connersville, Ind.

PURGERS
Armstrong Machine Works, Three Rivers, Mich.
Frick Company, Waynesboro, Pa.
Rex Engineering & Sales Co., Oklahoma City, Okla.

RAW WATER FREEZING SYSTEMS
Frick Co., Waynesboro, Pa.
Ice Plant Equipment Co., Inc., Philadelphia, Pa.
Martocello & Co., Jos. A., Philadelphia, Pa.
Vogt Machine Co., Henry, Louisville, Ky.

REBOILERS
Frick Company, Waynesboro, Pa.
Vogt Machine Co., Henry, Louisville, Ky.

REFRIGERATED ICE STATIONS
Dickinson & Co., F. B., Des Moines, Ia.
Refrigeration Engineering Co., Montgomery, Minn.
S & S Vending Machine Co., San Jose, Calif.
Thermo Cuber Co., Inc., Chicago, Ill.

REFRIGERATING AND ICE MAKING MACHINERY
(See Ice Making and Refrigerating Machinery)

REFRIGERATORS
Ice Cooling Appliance Corp., Chicago, Ill.

RESPIRATORS
Acme Protection Equipment Co., Chicago, Ill.

RUST PREVENTATIVES
Bower Chemical Mfg. Co., Henry, Philadelphia, Pa.
Wright Chemical Corp., Chicago, Ill.

SCORING MACHINES
Frick Company, Waynesboro, Pa.
Gifford-Wood Co., Hudson, N. Y.
Lilly Co., The, Memphis, Tenn.
Perfection Ice Scoring Machine Co., Fort Worth, Texas
United Ice & Oil Supply Co., Boston, Mass.

SECOND HAND MACHINERY AND SUPPLIES
Enterprise Equipment Corp., Yonkers, N. Y.
Kehoe Machinery Co., Inc., R. P., Ridgefield Park, N. J.
United Ice & Oil Supply Co., Boston, Mass.

SEPARATORS OIL, STEAM AND AMMONIA
Acme Industries, Inc., Jackson, Mich.
Frick Company, Waynesboro, Pa.
King-Zeero Company, Chicago, Ill.
National Pipe Bending Co., New Haven, Conn.
Vogt Machine Co., Henry, Louisville, Ky.

SHOULDER PADS
Gifford-Wood Co., Hudson, N. Y.
Index Coupon & Supply Co., La Porte, Ind.
Lilly Co., The, Memphis, Tenn.
United Ice & Oil Supply Co., Boston, Mass.
Vivian Mfg. Co., St. Louis, Mo.

SIZED ICE EQUIPMENT
Bateman Foundry & Machine Co., Inc., Mineral Wells, Texas
Gifford-Wood Co., Hudson, N. Y.
Ice Plant Equipment Co., Inc., Philadelphia, Pa.
Lilly Co., The, Memphis, Tenn.
Vivian Mfg. Co., St. Louis, Mo.

SPRAY NOZZLES
Ice Plant Equipment Co., Inc., Philadelphia, Pa.
Martocello & Co., Jos. A., Philadelphia, Pa.

SPRAY PONDS
Frick Company, Waynesboro, Pa.

STORAGE HEATERS
National Pipe Bending Co., New Haven, Conn.

STRAINERS
Ice Plant Equipment Co., Inc., Philadelphia, Pa.
Martocello & Co., Jos. A., Philadelphia, Pa.

TANKS
Frick Company, Waynesboro, Pa.
Vogt Machine Co., Henry, Louisville, Ky.

TARPAULINS
Ice Plant Equipment Co., Inc. Philadelphia, Pa.
Index Coupon & Supply Co., La Porte, Ind.
Lilly Co., The, Memphis, Tenn.
United Ice & Oil Supply Co., Boston, Mass.
Vivian Mfg. Co., St. Louis, Mo.

THERMOMETERS
Ice Plant Equipment Co., Inc. Philadelphia, Pa.
Martocello & Co., Jos. A., Philadelphia, Pa.

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Capital Elevator & Mfg. Co., The, Columbus, Ohio
Gifford-Wood Co., Hudson, N. Y.

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Armstrong Machine Works, Three Rivers, Mich.
Rex Engineering & Sales Co., Oklahoma City, Okla.

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Moto-Truc Co., The, Cleveland, O.

UNIT COOLERS
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Howe Ice Machine Co., Chicago, Ill.
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Rempe Company, Chicago, Ill.

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Enterprise Equipment Corp., Yonkers, N. Y.
Kehoe Machinery Co., Inc., R. P., Ridgefield Park, N. J.

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Shank Co., Cyrus, Chicago, Ill.
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VALVES, COMPRESSOR
Voss, Inc., J. H. H., New York, N. Y.

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Vogt Machine Co., Henry, Louisville, Ky.

WATER SUPPLY CONTRACTORS
Layne & Bowler, Inc., Memphis, Tenn.

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Industrial Filter & Pump Mfg. Co. Inc., Chicago, Ill.
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6—6x6 York's, 200 RPM — 20
1—6x6 Frick, 257 RPM — 21
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2—6½x6½ Arctics, 350 RPM, forced feed lub. — 30
1—7¼x7¼ Baker, 350 RPM, forced feed lubrication — 35
1—7x7 Frick, 200 RPM — 40
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1—10x10 York, 257 RPM, forced feed lub. — 80

Item No.

1—10x10 Carbondale, 100 HP synch. motor, 350 RPM — 81
3—10x10 York's, 225 RPM, semi-forced feed lub. — 82
1—11x13 York, 164 RPM, forced feed lub. — 90
2—12x12 Frick, direct conn. 150 HP synch. motor — 98

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1—8x8 York—Direct connected to 50 HP Fairbanks-Morse at 257 RPM — 210

Steam Driven
1—8x8 Vertical York, 300 RPM direct connected — 327

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10,000 feet wrought Iron pipe—2"—like new — 451

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1—15-ton electric driven plant — 630
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1—247 Can, 22-ton ice plants, like new 632A
1—35-38 ton New Clear Ice Making Plants — 635

Item No.

1—150 Ton Multi lift—1622 Can Plant — 636
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1—920 Can Plant—12 Can Pull — 638
1—150 Ton Ice Plant—2 Tank — 660

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1—4½x5 Lipman—360 RPM — 744
1—3x3 Worthington — 748
1—5x5 Frick—Forced Feed—400 RPM Latest Type — 758

Used Ice Cubers
1—300 lb. ULINE, fully automatic cuber — 501
1—50 lb. F & E Safety Cuber — 502

Condensers
3—100 ton shell and tube condensers retubed — 919
1—125-ton, Vertical Shell & Tube, 196 2" tubes — 921
1—120 ton, 216—2" retubed Vertical Shell & Tube — 922
2—20 ton Horizontal—retubed — 924

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2000 Cans—Like new—11"x22"x47" — 950

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All classified advertisements are payable in advance. Except for Positions and Help Wanted classifications, this section is reserved exclusively for USED equipment.

RATES: $3.50 for 50 words or less; 08c for each additional 10 words or fraction thereof; 75c per line for bold face headings; $8.00 per inch for line listings.

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FOR SALE—Bargain price to ice man wanting a change. Ice manufacturing and cold storage business in good condition. Good territory with trucks serving established routes. Dwelling included. Fine Florida location. Good reason for selling. Terms to responsible man. Address Box MR-10, Ice and Refrigeration, 435 N. Waller Ave., Chicago 44, Ill.

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9x9 Frick, type H, 360 r.p.m., direct connected to 3/60/440 volt synchronous motor, with frequency control panel and MG exciter unit. Bargain. Excellent condition.
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809 Woodland Tel. VI-0018 Kansas City, Mo.

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FOR SALE—One new Gifford-Wood F scoring machine complete with 3 h.p. motor, 3 phase, 60 cycle, 220 volt. Never used. Write John Peters, Williamsport, Penna.

FOR SALE—New Ideal engine type, 40 h.p. synchronous motor, 220 volt, 400 r.p.m., with exciter and control. Arctic Engineering Co. Inc., 4 White St., New York 13, N. Y.

WANTED—One medium duty Link Belt ice crusher-slinger, electric powered. Quote price and condition first letter. Jasper Ice & Fuel Co., Inc., 210 Mill St., Jasper, Indiana.

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Two G.E. 100 h.p. 300 r.p.m. synchronous motors, complete with motor generator sets and starting equipment. New 1948.
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500 Arctic Pownall ice cans.
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Phone: BAldwin 9-5932 Philadelphia 32, Pa.

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1—7½x7½ York with 40 h.p. motor 360 r.p.m.
1—6½x6½ York direct connected to a 40 h.p. direct current motor 360 r.p.m.
1—6½x6½ York 360 r.p.m.
1—6x6 Frick with 30 h.p. motor 360 r.p.m.
1—5x5 York self-contained unit, late style.
2—4x4 York self-contained units, late style.
2—3x3 York self-contained units.
Motors and starters for all compressors.
1000 ice cans, various sizes.
2—Miller ice scoring machines.
Condensers, brine coolers, cranes, can dumps, can fillers, etc. Send us your requirements on any equipment you may need.
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FOR SALE
4—HSA 2490 hot shots for ammonia 220/60/1 motors w/220/60/3 heaters.
2—HSC 50 hot shot controls.
These have never been uncrated.
Price $3500 F.O.B. Medford.
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FOR SALE—ICE PLANTS & EQUIPMENT
20 - 40 - 50 - 60 Ton Ice Plants—Immediate Sale.
1—12"x12" Duplex Frick Ammonia Compressors direct connected to synchronous motor.
1—10"x10" York ammonia compressor direct connected to 60 H.P. synchronous motor 200 R.P.M.
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1—9"x9" ammonia compressor direct connected to 50 H.P. synchronous motor 200 R.P.M.
1—10"x10" York ammonia compressor 200 R.P.M.
1—8"x8" York ammonia compressor direct connected to 60 H.P. synchronous motor 360 R.P.M.
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1—6"x6" Voss ammonia compressor.
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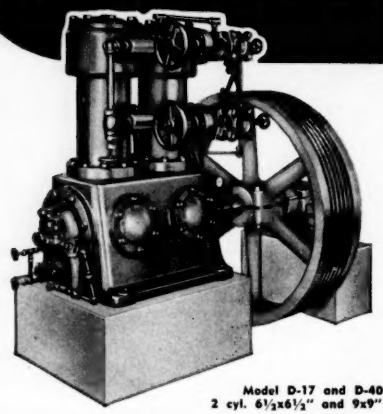

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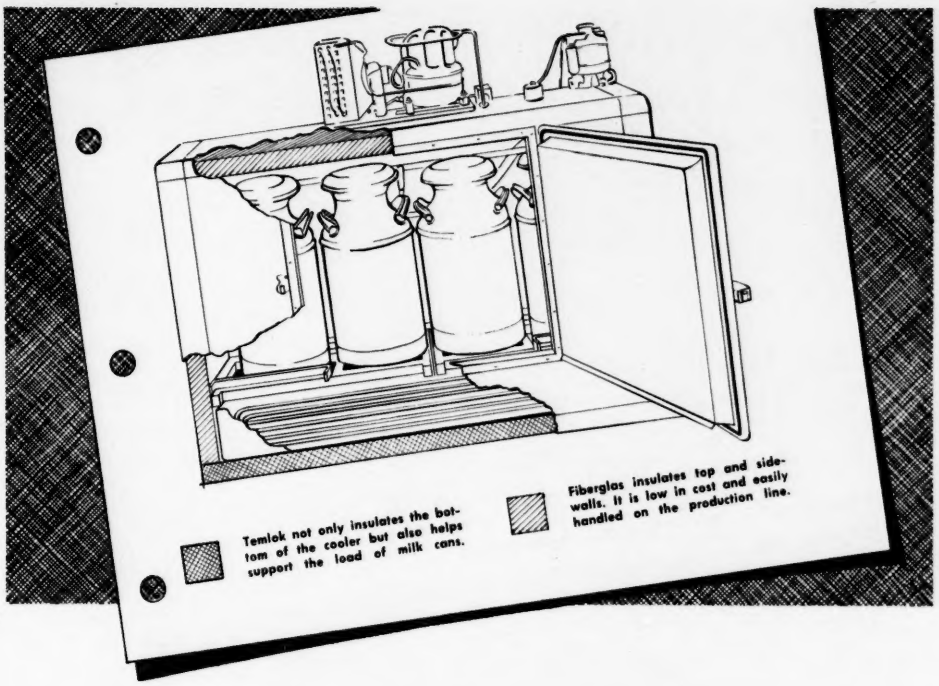
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Fiberglas insulates top and sidewalls. It is low in cost and easily handled on the production line.

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It would be impractical to recommend one insulation as the best for all milk coolers. In each case you must first study the design and construction of the cooler before you can decide on the most efficient materials.

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Before you make any decisions on insulations for your next job, why not call in an Armstrong engineer. He's had a lot of experience in the field, and his advice probably will help make your equipment more efficient. You'll find an Armstrong engineer impartial in his recommendations because he has all three types of insulation to offer: Armstrong's LK® Corkboard, Temlok, and Fiberglas.

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For full information on Armstrong's Equipment Insulation and Life Test Service, call the Armstrong office nearest you or write to Armstrong Cork Company, Equipment Insulation Department, 4504 Queen St., Lancaster, Pa.

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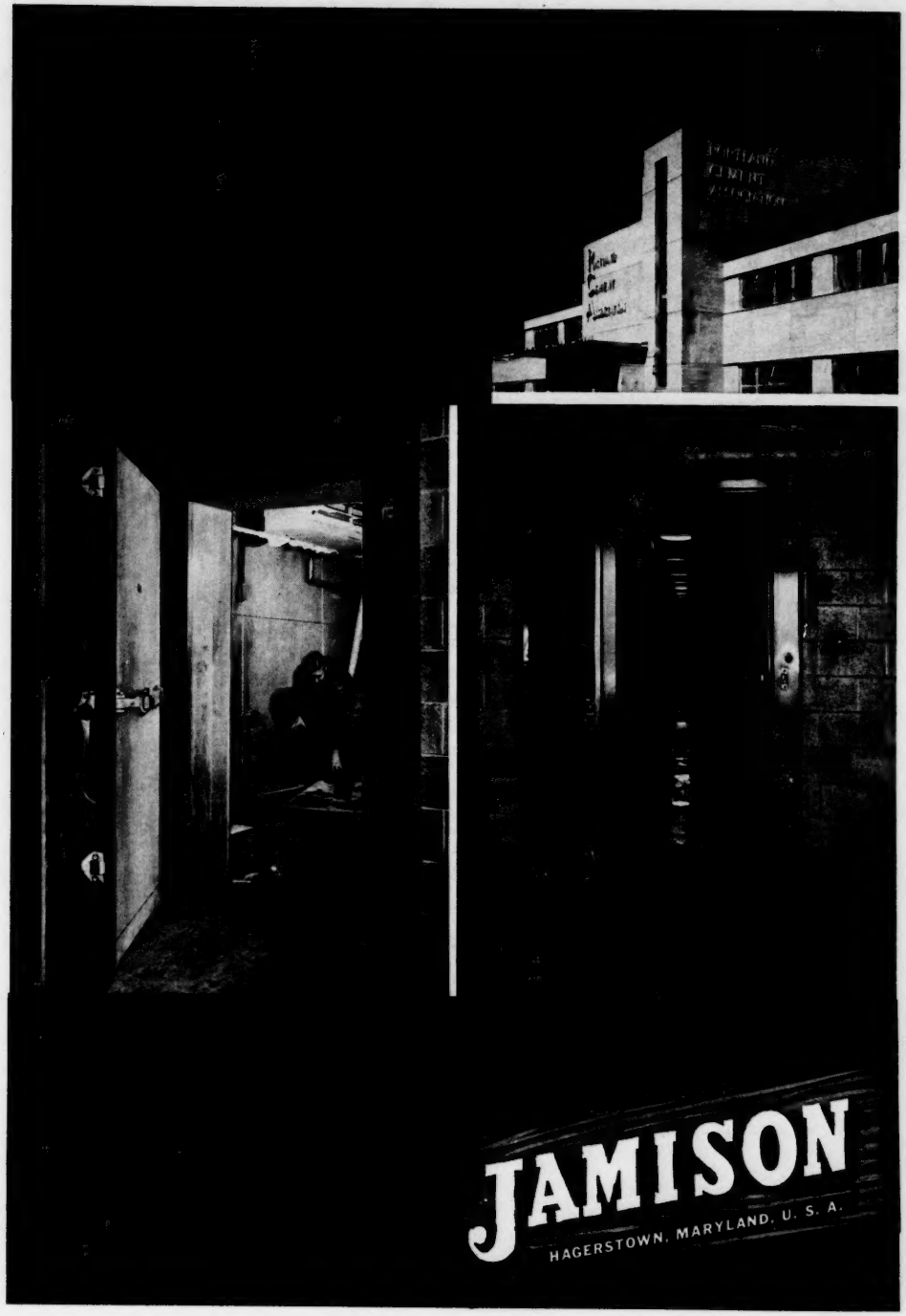
ARMSTRONG'S EQUIPMENT INSULATION

LK CORKBOARD • FIBERGLAS • TEMLOK


JAMISON
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